TENTH

ANNUAL REPORT

OF

THE DEPUTY MASTER OF THE MINT.

1879.

Presented to both Houses of Parliament by Command of Her Majesty.

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THE DEPUTY MASTER OF THE MINT.

SIR,

I HAVE the honour to submit, for the consideration of the Lords Commissioners of Her Majesty's Treasury, my Tenth Annual Report on the Royal Mint.

The gold coinage of the year, which only occupied a part of the month of December, has been insignificant, while the amount of silver coined has hardly exceeded the average, and the bronze coinage, though larger than in 1878, has not been so great as in the two preceding years. The continued absence of a demand for gold coin has enabled the Mint to execute the whole of the work devolving upon it, with the exception of one Colonial coinage entrusted to a private firm. Had the demand for gold been normal, it would no doubt have been necessary, as in former years, to make provision for the execution of a large part of the bronze coinage by contract; but the depression of trade during the greater portion of the year had its natural effect upon the requirements of the country, and the gold coin in circulation, with a small amount imported from Australia, was sufficient to meet the wants of the Bank of England.

Coinages executed during the year.

The coins struck during the year 1879 were of twenty different denominations, namely:—

British Coinage.

Gold.—Sovereigns.
Half-sovereigns.
Silver.—Half-crowns.
Florins.
Shillings.
Sixpences.
Fourpences (Maundy money only).
Threepences.
Twopences (Maundy money only).
Pence (do.).
Bronze.—Pence.
Halfpence.
Farthings.

Hong Kong.

Silver.—Twenty Cents.
Ten Cents.
Five Cents.
Bronze.—Cents.

Cyprus.

Bronze.—Piastres.
Half-piastres.
Quarter-piastres.

The total number of pieces struck at the Mint was 30,050,344, as against 24,491,230 in 1878, and their value, real or nominal, 662,664*l.* 3*s.* 0*d.**

The total number of British coins struck during the year was 27,800,344, and their value as follows:—

	£	s.	d.	£	s.	d.
Gold:						
Sovereigns	20,013	0	0			
Half-sovereigns	17,600	10	0			
				37,613	10	0
Silver:						
Half-crowns	112,669	10	0			
Florins	151,224	14	0			
Shillings	180,575	7	0			
Sixpences	83,157	16	6			
Fourpences (Maundy)	86	14	0			
Threepences	39,309	8	3			
Twopences (Maundy)	57	14	2			
Pence (do.)	44	5	6			
				567,125	9	5
Bronze:						
Pence	31,943	13	0			
Halfpence	7,463	12	8½			
Farthings	4,142	17	11			
				43,550	3	7½
Making a total of				648,289	3	0½

Gold coinage.

The demand for gold coin during the year, as already shown, has been very small, no gold having been sent in for coinage by the Bank of England until the month of November. This is the more remarkable as the consignments of sovereigns from the Sydney and Melbourne Mints received at the Bank were smaller by more than a million than those of 1878, which had themselves shown

* For detailed statement, see Appendix, page 40.

a falling off of a million as compared with the importations of the previous year. The amount of Australian sovereigns received was 1,617,000*l.*, as against 2,773,000*l.* in 1878, and cannot be held to have had any appreciable effect upon the circulation. The coinage of gold was resumed in January 1880, and was continued until the end of March last.

Importation of light gold coin for re-coinage.

Of the bullion imported into the Mint by the Bank of England in November last, 730,000 ounces, or 2,842,437*l.*, consisted of light gold coin withdrawn from circulation and sent in for re-coinage. The previous coinage, which commenced in November 1877 and terminated in 1878, comprised, as shown in my last Report,* light gold to the amount of 1,557,500*l.*

Silver coinage.

The amount of silver coin struck during the year was 567,125*l.*, as against 614,426*l.* in 1878, and 407,822*l.* in 1877, and the amount issued was 618,800*l.* Of this amount 153,430*l.* was sent to the Bank of England, 130,000*l.* to the Bank of Ireland, and 298,470*l.* to Colonies, 32,400*l.* was shipped for the use of Treasury chests abroad, and 4,500*l.* in threepences was sold direct to banks and private persons. No silver coin was issued to Scotch Banks. The total issues of threepences amounted to 37,220*l.*, as against 30,425*l.* in 1878, and, as in previous years, persons applying for small sums in coins of that denomination were referred to a London bank which requested to be relieved of a surplus stock.

The nominal value of the half-crowns issued during the year was 151,550*l.*, and the total amount of those coins put into circulation since 1874, when their coinage was resumed, has thus been increased to 827,150*l.*

England.

The following table, in continuation of those given in former Reports, shows the amount of silver coin issued by the Mint to the Bank of England, and the general results of the transactions of the Bank in regard to the silver coinage, during recent years :—

Year.	Received by the Bank from the Mint.	Issued by the Bank to the Public.	Received by the Bank from the Public.	Worn Coin withdrawn from Circulation.
	£	£	£	£
1867	87,000	—	17,000	60,000
1868	175,000	193,000	—	75,000
1869	30,000	228,000	—	105,000
1870	188,000	328,000	—	80,000
1871	566,000	650,000	—	75,000
1872	972,000	910,000	—	65,000
1873	578,000	595,000	—	95,000
1874	500,000	432,000	—	115,000
1875	481,000	433,000	—	143,000
1876	87,000	57,000	—	275,000
1877	186,300	66,000	—	170,000
1878	215,500	187,000	—	220,000
1879	153,430	—	121,700	240,000

It will be seen that during the past year, while the amount of new coin issued to the Bank has been considerable, and the

* Ninth Annual Report (1878), page 5.

amount of worn coin withdrawn from circulation has exceeded even the large withdrawals of 1878 by 20,000*l.*, the sum received by the Bank from the public has been larger by 121,700*l.* than that which it has issued. In 1878 the issues by the Bank to the public exceeded the receipts from the public by 187,000*l.*, a sum far larger than in the two previous years, and appeared to show that the demand for silver coin in England and Wales had to some extent revived. It will be remembered, however, that the last months of that year were marked by general uneasiness in consequence of bank failures, and it is probable that the increased demand was merely caused by the desire of country banks to strengthen their position for the moment. It is certain that, when confidence had been restored, large amounts both of gold and silver coin returned to the Bank of England, and that, the legitimate demand being no doubt greatly diminished by agricultural distress following a long period of commercial depression, coin continued to flow into the Bank during the greater part of 1879 in much larger quantities than were issued to the public.

Scotland and Ireland.

The amounts of silver coin issued to, and withdrawn from circulation in, Scotland and Ireland, through Scotch banks and the Bank of Ireland, from 1872 to 1879 inclusive, are shown in the following table, in continuation of that given in my last Report:—*

Year.	New Coin issued.		Worn Coin withdrawn from Circulation.	
	To Scotch Banks.	To Bank of Ireland.	In Scotland.	In Ireland.
	£	£	£	£
1872	180,000	Nil.	26,510	15,000
1873	154,000	2,000	73,263	Nil.
1874	Nil.	5,000	25,900	10,400
1875	67,550	50,000	11,000	Nil.
1876	Nil.	20,000	Nil.	Nil.
1877	94,000	10,000	37,280	Nil.
1878	41,000	156,200	72,635	105,500
1879	Nil.	130,000	Nil.	216,200

The issues and withdrawals in Ireland, as will be seen by this statement, have again been very considerable, and show that the renewal of the silver coinage in that part of the United Kingdom has proceeded satisfactorily during the past year. The amount issued has been rather less than in 1878, when systematic arrangements for improving the condition of the silver coinage in

* Ninth Annual Report (1878), page 6.

Ireland were first adopted by the banks, while the amount withdrawn has been more than doubled.

In Scotland, on the other hand, where steps were sooner taken to renew the silver coinage, and where both issues and withdrawals since 1872 have usually been considerable, no coin has been issued or withdrawn. This change is no doubt to be explained by the continued depression of trade, and by the satisfactory state of the coinage consequent upon the withdrawals of worn coin in former years.

I append, as usual, statements showing the amounts of silver coin issued to, and withdrawn from circulation in, Colonies during the past year :— Colonies.

SILVER COIN TRANSMITTED TO COLONIES.

	£	s.	d.
Victoria	125,500	0	0
New South Wales	85,000	0	0
South Australia	30,000	0	0
Western Australia	5,000	0	0
New Zealand	500	0	0
West Indian Colonies	39,550	0	0
Natal	7,800	0	0
West Africa	3,120	0	0
Cape of Good Hope	2,000	0	0
	£298,470	0	0

WORN SILVER COIN WITHDRAWN FROM COLONIES.

	£	s.	d.
New South Wales (by Sydney Mint)	890	0	0
Victoria (by Melbourne Mint)	24,230	0	0
Gold Coast	3,820	0	0
Mauritius	1,722	15	0
Sierra Leone	642	1	9
Natal	8,000	0	0
Antigua	440	0	0
	£39,744	16	9

These statements prove how greatly the demand for Imperial silver coin has been stimulated in Colonies by the arrangements sanctioned by their Lordships at the beginning of the year, and described in my last Report,* under which this Department has been authorised to pay all expenses connected with the carriage of new silver and bronze coin to Colonies, and of worn coin to the Mint or one of its branches. The amount of new silver coin shipped to Colonies in 1878 was only 69,950*l.*, whereas in 1879 it rose to 298,470*l.*, no less than 125,500*l.* having been sent to

* Ninth Annual Report (1878), page 9.

Victoria alone, and 85,000*l.* to New South Wales. My last Report showed that in the case of these two Colonies, which possess branches of the Mint, their Lordships permitted this Department to ship silver coin to each Branch, and to accept payment for it in instalments, as it should be disposed of to the public. It was further explained that the Government of Victoria had since 1872 taken no official steps for the issue or withdrawal of silver coin. It was natural, therefore, that the initial demand in that Colony should be greater than elsewhere, and that, owing to the facilities afforded by the Sydney Mint, large issues should also be required for New South Wales. The demand for South Australia also rose from 12,000*l.* in 1878 to 30,000*l.* in 1879, and that for the West Indian Colonies from 10,000*l.* to 39,550*l.*

The increase in the withdrawals of worn coin, which amounted to 39,744*l.*, as against 8,952*l.* in 1878, is not so remarkable, except in the case of Victoria, where, as above stated, but little had been done in former years towards a renewal of the silver coinage. It may be hoped, however, that, as the new coin finds its way into circulation in larger quantities, Colonial Governments and banks will in all cases be able gradually to effect the withdrawal of that part of the silver currency which has become unfit for use.

Of the silver coin withdrawn from circulation in Mauritius, 550*l.* consisted of three-halfpenny pieces, which had become uncurrent under the Order in Council of the 12th of August 1876, substituting the rupee of India and its sub-divisions for the gold and silver coins of the United Kingdom as legal tender in that Colony and its dependencies.*

Seignorage.

The average market price at which standard silver has been purchased for coinage during the year has been $52\frac{7}{8}d.$ per ounce, so that, the rate at which silver coin is issued by the Mint being 66*d.* per ounce, the seignorage accruing to the State has been at the rate of $13\frac{1}{8}d.$ per ounce, or $24\frac{13}{16}$ per cent. In 1878 the average price at which silver was purchased by the Mint was $50\frac{1}{16}d.$ per ounce, and the rate of seignorage $31\frac{3}{4}$ per cent. The rate of seignorage in 1879, therefore, was nearly 7 per cent. less than in the previous year. The following table, in continuation of that given in my last Report,† shows the rate at which seignorage has accrued in each year from 1870 to 1879 inclusive:—

Year.	Rate of seignorage.
1870	9 per cent.
1871	$9\frac{1}{4}$ „
1872	$9\frac{1}{2}$ „
1873	$12\frac{1}{4}$ „
1874	$12\frac{1}{3}$ „
1875	16 „

* See Seventh Annual Report (1876), pages 11 and 58.
† Ninth Annual Report (1878), page 10.

Year.	Rate of seignorage.
1876	(No silver bullion bought).
1877	17¾ per cent.
1878	31¾ „
1879	24 13/16 „

The usual Return of the sums advanced to the Master of the Mint from the Consolidated Fund for the purchase of bullion for coinage, and of the amounts repaid by the Mint to the Exchequer, is given in the Appendix.* During the past year the advances, 625,000*l.*, have been very large, and have exceeded the repayments by no less than 150,000*l.* The balance due to the Exchequer, therefore, at the end of the year was 435,000*l.*, as against 285,000*l.* at the close of 1878. The existence of so large a debt to the Exchequer is chiefly owing to the arrangements sanctioned by their Lordships in February 1879, as mentioned above, under which payment for silver and bronze coin sent to the Branch Mints at Sydney and Melbourne for issue to the public is received in instalments. The consignments of silver coin, made under this arrangement, have amounted to 210,000*l.*, of which only 24,230*l.* had been paid for before the 31st of December, and the sum still due to the Master of the Mint, therefore, at the close of the year was 185,770*l.* It may be hoped that in future years, when the initial demand for new coin in New South Wales and Victoria has been satisfied, and the requirements of those Colonies have become normal, the amount of the outstanding debt from the Branch Mints may be permanently diminished; but it is to be remembered that, besides the consignments to Australia, for which no payment has been received, the large amounts of silver and bronze coin which must be kept in stock to meet the Home and Colonial demand will always constitute a considerable balance due by the Mint to the Exchequer.

Bronze coinage

Notwithstanding that, since the introduction of the bronze coinage in 1860, a total amount of 1,446,000*l.* has been issued to the public, or nearly three times the amount of the old copper coin withdrawn from circulation, the demand for bronze coin has as yet shown but little tendency to decrease. I append a table of the amounts issued during the last ten years :—

Year.	Nominal Value.
	£
1870	25,960
1871	32,203
1872	48,800
1873	43,745
1874	62,110
1875	70,595
1876	49,576
1877	42,050
1878	39,205
1879	38,970

* Appendix, page 53.

It will be seen that the issues in 1879 have amounted to 38,970*l.* as against 39,205*l.* in 1878. Of this amount 28,050*l.* consisted of pence, 7,735*l.* of halfpence, and 3,185*l.* of farthings, so that the issue of pence has exceeded that of the previous year, while that of halfpence and farthings has been rather less. There has been no suspension in 1879, as in some previous years, of the issue of bronze coin in the metropolitan district, but from September to December last applicants for coin from the north of England were referred to a banking firm at Newcastle-on-Tyne, which had intimated that it held a stock in excess of its own requirements.

The issue of bronze coin to the Colonies, and in aid of Treasury chests abroad, during the year were as follows:—

	£
New Zealand	2,500
South Australia	2,240
Victoria	2,080
New South Wales	1,000
West Indies	1,000
Western Australia	400
British Guiana	400
Natal	200
West Africa	30
	£9,850

The bronze metal purchased during the year amounted to 100 tons, in bars ready for coinage.

Bronze coinage for Cyprus.

I need not again refer to the coinage of bronze piastres, half-piastres, and quarter-piastres executed in March 1879 for the Government of Cyprus, of which the particulars are given in my last Report.*

Colonial coinages.

The only Colonial coinage executed by the Mint during the year was a silver and bronze coinage of twenty, ten, five, and one-cent pieces for the Government of Hong Kong, of the nominal value of 10,000*l.* A silver coinage for the Government of the Straits Settlements, of the nominal value of 8,333*l.*, and consisting of twenty, ten, and five-cent. pieces, was executed by Messrs. Ralph Heaton & Sons, of Birmingham, in the month of May, with the sanction of their Lordships, and under the supervision, as usual, of this Department. Since the close of the year applications have been received for the execution of a gold, silver, and bronze coinage for the Government of Newfoundland, and of a further silver and bronze coinage for the Government of Hong Kong, of which particulars will be given in my Report for the current year.

I append, as usual, a Return† showing the amount of coinage executed during the last ten years, together with other Returns and Accounts as given in former Reports.

* Ninth Annual Report (1878), page 12.
† Appendix, page 54.

The General Account* shows a net loss on the transactions of the Mint during the year of 27,955*l.*, as against a loss of 51,543*l.* in 1878. Coinage Returns.

The annual profit or loss to the Mint on its operations depends in a great measure, as has been frequently explained, on the amount of silver bullion purchased in each year, and on the amount of worn silver coin withdrawn from circulation, the bullion being converted into coin at a profit to the State, and the worn coin being purchased at its full nominal value and re-coined at a loss. The pecuniary results of each year's transactions are further affected by the amount of bronze metal purchased for coinage, and rated, as shown in the "Bronze Coinage Account,"† at the nominal value of the coin to be produced from it. At times when trade is expanding, therefore, and the demand for silver and bronze coin is large, the profits of the Department considerably exceed its expenses, and this it may be hoped will generally prove to be the case. Of the eight years which have elapsed since a "Profit and Loss Account" was first compiled in the present form, the first four show a profit varying from 98,313*l.* in 1872 to 26,435*l* in 1874. In 1876 there was a loss of 24,719*l.*, which was entirely due to the suspension of the coinage for nearly five months in consequence of a break-down of machinery. In 1877 there was a profit of 32,041*l.*, and it was not until 1878 that the effects of the contraction of trade manifested themselves in a falling off in the demand for coin and a reflux of large amounts of worn silver to the Mint. In that year, and in 1879, as above shown, the transactions of the Department have resulted in a considerable loss, but it is satisfactory to note that, after payment of superannuation and compensation allowances, and of all expenses incurred by other Departments on behalf of the Mint, the operations of the last eight years show an average annual profit of 21,117*l.* In 1879 the profit on the coinage of silver bullion was only 25,548*l.*, as against 31,993*l.* in 1878, while the loss on worn silver coin, including the coin withdrawn from circulation by the Sydney and Melbourne Mints, was 55,047*l.*, as against 48,959*l.* in 1878. On the other hand, however, the profit on the bronze coinage was 35,396*l.*, as against 1,751*l.* only in 1878, and the operations of 1879 consequently show an excess of expenditure over receipts far less considerable than that of the preceding year.

It is optional with the Deputy Masters at Sydney and Melbourne either to send home the worn silver coin withdrawn from circulation or to melt it down and dispose of the silver in the Colony on account of the Master of the Mint, and it will be observed, in the "Silver Coinage Account,"‡ that the loss on the worn coin withdrawn by the Melbourne Mint only is shown. The Deputy Master at Sydney having elected to dispose of the silver in the Colony, the transactions of the Sydney Mint do not

* Appendix, page 50.
† Appendix, page 52.
‡ Appendix, page 51.

appear in the "Silver Coinage Account," the loss resulting from the sale by that Branch of ingots produced from worn coin appearing in the General Account of expenses and receipts.

Estimates.

In my last Report* I stated that the loss on worn silver coin withdrawn from circulation in the year 1879–80 could not safely be estimated at less than 35,000*l.*, the expenditure under this Sub-head of the Mint Vote for the previous financial year having amounted to 56,308*l.*, and at the same time I expressed a hope that, after the very large withdrawals of 1878-79, the amounts of worn coin to be received by the Mint might not be so great as to render a Supplementary Vote necessary. This hope, however, was not realised. The withdrawals of worn coin continued as large and as frequent as in the previous year, and the amounts received during the calendar year 1879, 495,945*l.*, have actually exceeded those received in 1878 by more than 75,000*l.* It became evident, therefore, soon after the beginning of the financial year, that a considerable sum beyond that which was originally estimated would be necessary to meet the probable expenses under this Sub-head, and in July a Supplementary Vote for 30,000*l.* was submitted to Parliament, and passed before the end of the session of 1879. By this addition the total Vote for 1879-80 was raised to 93,665*l.*, as against 81,035*l.* in 1878–79, when the original Vote taken for loss on worn silver coin was only 25,000*l.* The Vote for 1879–80 had already been augmented, as shown in my last Report,* by the creation of a new Sub-head for the "Supply of "silver and bronze coin to Colonies," under which the sum voted was 3,000*l.* It was obviously difficult to estimate the expenditure under this Sub-head, as it was doubtful to what extent Colonial Governments would avail themselves of the advantages accorded to them by the arrangement which provided for the payment of the expenses of renewing the silver and bronze coinages in Colonies by the Imperial Government. It has been already shown that the immediate effect of the new regulations has been to increase very largely the Colonial demand for silver coin, and the expenditure has in fact exceeded the sum voted for this service by more than 1,000*l.*, which has been made good from savings under other Sub-heads.

The Estimate for 1880–81 calls for no special remark. Owing to the abolition of the situations of Resident Engraver and Housekeeper, and a reduction of 300*l.* in the amount taken for piece and time wages, the sum to be voted under "Salaries" is less by 400*l.* than in the preceding year, although provision is made for certain increments of salaries and for the wages of an additional Artificer. Reference to these changes of establishment is made below. The sum to be voted for loss on worn silver coin has again been fixed at 35,000*l.*, as it seems unlikely that the withdrawals of coin can continue to be so abnormally large as in the last two financial years. Nor has any increase been made in the estimate of 3,000*l.* for the supply of silver and bronze coin to Colonies, as it is probable, looking to the large amounts of coin already issued, that

* Ninth Annual Report (1878), page 14.

the demand for Australia and elsewhere will not be so great as in the past year, and that the sum to be voted will be found sufficient. The total amount of the Estimate is 63,265*l.*, as against 63,665*l.* originally voted for 1879–80.

Establishment. Their Lordships were pleased in May 1876, as stated in my Report for that year,* to authorise the conversion of three Writerships in the Mint into "Clerkships of the Lower Division" under the Order in Council of the 12th of February 1876, and under this arrangement one of these appointments was filled up by the promotion of a Writer already employed in the Department, and one by open competition, while the duties of the third continued to be performed by a Writer whose service did not qualify him for advancement to the permanent establishment. The last-named appointment, having become vacant by resignation in March 1879, was filled up by the nomination of a candidate who had been successful in an open competition for clerkships of this class. The appointment of Housekeeper having also become vacant, by superannuation, on the 1st of November last, I was able to recommend the abolition of the situation, and the transfer of its duties to the Office-keeper. This arrangement received their Lordships' sanction, as did also the abolition of the office of Resident Engraver, which had become vacant by the death of Mr. T. J. Minton. I explain in a subsequent part of this Report† the circumstances under which it was found possible to abolish the latter appointment, and to substitute for a Resident Engraver an Artificer of a somewhat superior class. By these changes of establishment a saving has been effected of rather more than 150*l.* a year. In the month of May the Mint sustained a serious loss by the death of Mr. John Murray, Overman of Artificers, to whose thorough efficiency the successful results which have attended the re-organisation of the Machinery Department made in 1869‡ are in a great measure due. The situation of Office-keeper has also become vacant since the beginning of the present year by the resignation of Mr. Daniel Fisher, on his appointment as Superintendent of Messengers under the Parliamentary Secretary of the Treasury in the room of the late Mr. Vargas. I should not be justified in recording Mr. Fisher's resignation without bearing testimony to the exemplary manner in which he has for fifteen years discharged the duties of Office-keeper, which in the Mint demand more than ordinary intelligence.

Mint Office. The amount of specie packed for Treasury chests abroad has again shown a considerable increase. The nominal value of shipments made during the year was 925,972*l.*, as against 833,612*l.* in 1878, and of this amount 862,500*l.* consisted of British coin, principally sovereigns and half-sovereigns, of which more than 640,000*l.* was shipped to Natal. The consignments of Mexican dollars to Hong Kong and the Straits Settlements were not large, having amounted only to 63,472*l.*

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* Seventh Annual Report (1876), page 12.
† Page 14.
‡ See First Annual Report (1870), page 44.

Visitors.

The number of visitors to the Mint in 1879 was 6,664, or almost the same as in the previous year. The orders of admission were 1,269.

Operative Department.

The annual Memorandum of the Superintendent of the Operative Department, is appended, as usual, to this Report.*

There is only one point of special interest in the proceedings of the past year to which I need call attention in connexion with Mr. Hill's Memorandum. The appointment of Resident Engraver having become vacant by the death of Mr. T. J. Minton, I considered it desirable, before reporting the vacancy, to make special inquiry into the duties of the office, and the result was to show that it was not necessary that it should be filled up. The more responsible part of the work entrusted to the Resident Engraver has consisted in the examination of all dies coming from the presses in which they are sunk, and in "punching in" the letters of the inscription and the figures of the date. After careful experiments, it has been found preferable to complete all letters and figures on the "matrix" from which the working dies are reproduced, the examination of the matrices and of the punches being entrusted, as heretofore, to Mr. Leonard Wyon, the Chief Engraver. Some increase has been caused by this arrangement in the yearly number of matrices and punches to be produced, but all risk of error in "lettering" the working dies has been obviated. The increase of work in the Die Department has been provided for, with their Lordships' sanction, by the appointment of an additional Artificer.

The completion of a period of ten years since the establishment of the system under which the Mint is now conducted, has afforded Mr. Hill the opportunity of reviewing the changes and improvements effected during that time. With regard to the mechanical operations of coining, the experience of the last ten years has shown how greatly the Department has benefited by the concentration of authority in the hands of few officials under the control of a single "Superintendent of the Operative Department." It had long been felt, and the information collected during my inspection of European Mints in 1870 proved conclusively, that as regards mechanical appliances the Mint had not kept pace with certain other countries. No time was lost, therefore, in introducing improvements. The plumbago crucibles in almost universal use on the continent have replaced the iron pots previously used for silver melting, a change by which considerable expense has been saved, and additional facilities have thus been afforded for the daily control of the work of the Melting Department. Plumbago pans have also been substituted for the costly copper tubes for annealing "blanks." The thickness of both gold and silver bars has been reduced, so as greatly to diminish the annealing required. The process of "blanching," by which, as explained in my First Annual Report,† a film of fine gold is

* Appendix, page 33.

† First Annual Report (1870), page 32.

produced, has been entirely abolished in the case of gold coin, as it was considered undesirable that coins representing the standard of value should be issued with a surface of pure metal liable to rapid removal by wear. This change of practice, it may be mentioned, has been followed by many continental Mints. Four lever coining-presses, on the Uhlhorn principle, have been introduced, together with such other improvements of machinery as could be effected in the midst of the obsolete arrangements of the Department and without interrupting the coinage. The arrangement already mentioned under which the chief supervision of the Operative Department, including the Melting, Coining, Machinery, and Die Departments, was placed in the hands of one Superintendent, has tended to economy as well as efficiency, and other changes have also at different times been made with the same results. The Workmen and Boys in the Coining Department formerly received various rates of payment according to the number of good pieces produced, and, when the Mint was not at work, small allowances under the name of "subsistence-money." Another scale of payment, fixed according to the amount of metal treated, was in force in the Melting House. This system was open to the objection that, the subsistence-money being insufficient to maintain them, the more improvident workmen contracted liabilities and returned to work in debt, while the more skilful were induced to accept employment elsewhere and the Mint lost their services. A uniform rate of payment for piece-work and a more liberal allowance of subsistence-money were substituted for the different scales of wages throughout the Operative Department, and the evils above referred to have thus been obviated without increase of expense. The staff of Artificers, Smiths, Hammermen, and Enginemen, has been placed under one Overman, and has not only continued to supply the Department with the ordinary appliances used in the different processes of coining, but has manufactured the more important fittings of the machinery which had before been obtained from private firms. By this change alone a saving of more than 1,000*l.* a year was effected. On the termination of the contract for mounting medals and for supplying the bars and clasps attached to them, this work was entrusted to the Die Department, and since the 1st of April 1874 all medals required by the War Office, Admiralty, and India Office, have been completed within the Mint itself. Although two Artificers were added to the establishment, this change has involved no increase of charge to the public, and has been the means of putting an end to numerous complaints of bad workmanship.

It will be evident, from the foregoing statement of some of the more important reforms made in the mechanical branch of the Mint since the end of 1869, that no effort has been spared to place the Department upon a satisfactory footing, although, while the present defective arrangements are in force, many improvements of machinery and practice must necessarily be deferred; and I have much pleasure in bearing testimony to the advantage which the Department has derived from the vigilant control of Mr. Hill,

and the efficient manner in which he has been seconded by the officers under his directions.

Scientific arrangements.

I append* the annual Memorandum of the Chemist of the Mint.

It will be within their Lordships' recollection that the death of Mr. Graham, Master of the Mint, in 1869, made it necessary to consider what steps should be taken for providing in an adequate manner for the wants of the Department in regard to questions of a metallurgical and chemical character, and their Lordships were pleased, by minute of the 7th of January 1870, to place all such questions under the charge of a "Chemist of the Mint." Mr. W. Chandler Roberts, F.R.S., who was selected for this newly-created appointment, and who since the 1st of February 1871 has also been one of the Assayers, has in his Memorandum for the past year given a summary of the more important questions with which he has been called upon to deal during the last ten years. Mr. Roberts was directed to accompany me in my inspection of European Mints in 1870, in the course of which he was enabled to gather technical information of the highest importance, and, being placed in direct communication with the scientific officers of the respective Mints, to estimate at their true value numerous points affecting the interests of the Mint in this country. In the same year, it became desirable to investigate the cause of brittleness in gold, which had given rise to much anxiety and trouble both to the Mint and Bank of England, and Mr. Roberts was directed to report upon the subject. He succeeded in showing that brittle gold could be rendered malleable with but trifling loss, and their Lordships were pleased to express their satisfaction at a result which made it possible to terminate the vexatious discussion, frequently renewed between the Mint and the Bank, as to the right of the former to return bars found to be unfit for coinage. The Chemist of the Mint was in 1871 requested by the Warden of the Standards to undertake the preparation of new trial-plates of gold and silver for use at the annual trials of the Pyx, and throughout the Assay Offices of the United Kingdom, and to supplement them, as suggested in my First Annual Report,† with plates of pure gold and silver. The latter have, undoubtedly, for the first time in the history of minting, provided really trustworthy standards of reference, and their accuracy has been abundantly recognised in this country and abroad. I have already ventured, in my Report for 1873,‡ to express my satisfaction that a work beset with so many difficulties should have been entrusted to an Officer of this Department and accomplished with such signal success. The adoption of the new trial-plates, after verification by the independent authority of the Goldsmiths' Company, has afforded the means of securing rigid accuracy in

* Appendix, page 42.
† First Annual Report (1870), page 34.
‡ Fourth Annual Report (1873,) page 20.

the composition of the gold coinage, a point, it need hardly be remarked, of the highest importance in a country with a large metallic circulation, and in which gold is the sole standard of value.

It is unnecessary to describe in detail other work of a more strictly technical character, which has from time to time devolved upon the Chemist, and which has led to changes or improvements of practice, or has been undertaken with a view to ascertain how far advances in science generally could be brought to bear on the operations of minting. Among the researches undertaken with the latter object may be mentioned extended experiments in quantitative spectrum analysis, conducted in conjunction with Mr. J. Norman Lockyer, F.R.S., and others with a view of determining the relation between the density and composition of gold-copper alloys; and, more recently, investigations by means of Professor Hughes's induction-balance into the molecular structure of alloys. I should refer more particularly, however, to a suggestion which initiated one of the few changes of importance introduced in recent times into coinage operations. In his Memorandum for 1870,* Mr. Roberts pointed out that "blanks" might be adjusted to a uniform weight by the removal of metal by means of a suitable solvent aided by a battery, but the proposed process could not be adopted with profit in this Department, where it is necessary that the finished coins should be separately weighed. It has been recently adopted, however, at the Bombay Mint, where the "blanks" alone are weighed, and has been independently extended by depositing the dissolved metal upon light blanks; and its value is sufficiently shown by the fact that in October 1879 no less than five million silver pieces had been successfully treated by it.

I have touched thus briefly upon the various duties discharged by the Chemist of the Mint, in order to show that an experience of ten years has fully justified the appointment, and that a Mint cannot be properly conducted without constant attention to the progress of metallurgical science. I must not omit to add that the Department has derived great advantage from Mr. Roberts's high scientific attainments, and from his uniform desire to devote them to its service.

Trial of the Pyx.

The weight and fineness of the coins examined at the trial of the Pyx, held at Goldsmiths' Hall on the 2nd of July last, proved to be in every way satisfactory. The ceremony, however, possessed less interest than usual, as no gold coinage had taken place since the previous trial, and silver coins only, from a coinage of the nominal value of 534,996*l.*, were submitted to the jury. A copy of the verdict will be found, as usual, in the Appendix.†

Waste.

As the coinage of gold was only resumed in December last, no gold "sweep" was prepared for sale during the year. The silver "sweep," however, which was stated in my last Report‡ to be in course of preparation, was sold in the month of June, and the

* First Annual Report (1870), page 110.
† Appendix, page 57.
‡ Ninth Annual Report (1878), page 17.

accounts of the silver coinage adjusted. They show that the waste on a coinage of 614,394*l.* amounted to 656*l.* 10*s.* 2*d.*, or at the rate of 1,068*l.* 7*s.* 1*d.* per million. The amount realised by the sale of "sweep" was 132*l.* 14*s.* 10*d.*, so that the actual loss on the coinage was 523*l.* 15*s.* 4*d.*, or at the rate of 852*l.* 9*s.* 10*d.* per million. The loss on the two previous coinages was at the rate of 103*l.* 10*s.* 3*d.*, and 336*l.* per million respectively, and the amount of the loss on the coinage last completed appears, therefore, to require explanation. There are several reasons why the rates of loss on a silver coinage should vary. The amount of waste in each coinage necessarily depends in no small degree on the proportion of coins of the lower denominations produced, the loss on which is far greater than on the same weight of larger coins. In the last coinage the per-centage of small coins was unusually high, and the proportion of worn coin sent in for re-coinage, the melting of which is attended with greater loss than that of ingots, was also higher than on the previous occasion. But there was a further important reason for an increase of loss. The silver coins of the earlier part of the century, which till recently had formed the larger part of the worn coin withdrawn from circulation, were known to be slightly above the standard of fineness, and in re-melting them, therefore, it was necessary to add a small amount of copper to reduce the mass of metal to standard. It has been found, however, that during the last few years, as might be expected, the extra fineness of the coin withdrawn has gradually diminished, and that in the year under review it has practically ceased to exist. The addition of copper during the melting of worn coin has in consequence been discontinued, and the result has been a corresponding deficiency in the amount of metal to be converted into new coin. From these two causes there has necessarily been an increase in the rate of the apparent "loss;" but at the same time it should be mentioned that at the last trial of the Pyx the standard of the silver coin was found to be slightly higher than on the two previous occasions.

Price of silver.

The average price of standard silver in the London market for every month in the year 1879 is given in the following table:—

Month. (1879.)	Average price per ounce of standard silver in the London market.
	d.
January	$50\frac{1}{16}$
February	$49\frac{7}{8}$
March	$49\frac{1}{2}$
April	$49\frac{15}{16}$
May	$50\frac{7}{16}$
June	$51\frac{15}{16}$
July	$51\frac{1}{8}$
August	$51\frac{9}{16}$
September	$51\frac{9}{16}$
October	$52\frac{5}{16}$
November	$53\frac{5}{16}$
December	$52\frac{5}{8}$

The average price for the year, therefore, was $51\frac{3}{16}d.$, as against $52\frac{9}{16}d.$ in 1878 and $54\frac{3}{4}d.$ in 1877, or $1\frac{11}{16}d.$ lower than the average price, $52\frac{7}{8}d.$, paid, as above shown,* by the Mint. The purchases of bullion for coinage are regulated solely by the demand for coin, and in the past year no necessity for purchasing silver arose until the month of December, when the price was higher than it had ruled in the earlier part of the year. The rate of seignorage accruing from the conversion of the bullion into coin was consequently far lower than in 1878, when purchases were made under exceptionally favourable conditions.

I may again refer to Messrs. Mocatta and Goldsmid's annual circular, as giving a compendious statement of the changes which have taken place in the price of silver during the year. The fluctuations of price have been remarkable, but the general tendency has been to a higher value of the metal. The lowest quotation was $48\frac{3}{8}d.$ at the end of March, and the highest $53\frac{3}{4}d.$ in November, showing a difference of nearly 5*d.* per ounce. The causes of these fluctuations were various. In the early part of the year the price was at its lowest, but between the 20th of March and the month of May an active demand for India carried it up to $50\frac{1}{8}d.$, and the report that the German Government had decided not to sell any more of their surplus stock caused a further rapid advance to $52\frac{3}{4}d.$ In November, an increase in the amount of India Council bills had the effect of increasing the price to $53\frac{3}{4}d.$, the highest point attained in the year. The demand for India being at that time in excess of the home supply, considerable sums were purchased in Austria for shipment to the East, in addition to the amounts exported direct from London, which in the case of India alone reached a total of 6,500,000*l.* during the year. It is to be remarked that the shipments of Mexican dollars to the East have been much below the average, and that the balance of dollars imported into this country has been to a great extent refined and sold as bar silver.

Since the beginning of 1880 the London price of bar silver has been :—

Month. (1880.)	Average price.
	d.
January - - - -	$52\frac{7}{16}$
February - - - -	$52\frac{5}{16}$
March - - - -	52
April - - - -	52

showing an average for the four months of $52\frac{3}{16}d.$, or exactly 1*d.* above the average price for 1879.

Sydney Mint.

I append † the Annual Report of the Deputy Master of the Mint at Sydney. The issues of gold coin from that Branch of the Mint during the year amounted to 1,413,000*l.*, of which 1,366,000*l.* consisted of sovereigns, and 47,000*l.* of half-sovereigns,

* Page 8.
† Appendix, page 58.

as against 1,328,000*l.* in 1878. A considerable quantity of gold having been held over in expectation of the abolition of the gold duty, the Bill for which was not passed until the 1st of October last, the amount of gold sent in for coinage was less than in the previous year, and the Mint Revenue therefore only amounted to 9,370*l.* The total expenditure on account of the establishment was 12,388*l.* It has already been stated * that 85,000*l.* in silver coin was shipped to the Sydney Mint during the year, for issue to the public as required, and the bronze coin, of the nominal value of 1,000*l.*, mentioned as having been sent to New South Wales,† was also consigned to the Mint, under the arrangements sanctioned by their Lordships. Of these amounts 53,300*l.* in silver coin, and 910*l.* in bronze, were sold to the public, in accordance with regulations approved by the Governor of New South Wales, of which a copy is appended to Mr. Hunt's Report. Dr. Leibius, Senior Assayer of the Sydney Mint, having, with their Lordships' approval, received leave of absence for twelve months from March 1879, has taken the opportunity of visiting the Mints in this and other European countries, and of making himself practically acquainted with the details of their methods of working. In accordance with the arrangement mentioned in my Report for 1876 ‡ as having been made with the Mint at Melbourne, and since applied also to Sydney, a parcel of silver extracted from gold at the latter Branch, of the value of 4,487*l.*, was consigned to the Master of the Mint in October last, and purchased for coinage by this Department at the market price of the day on which it was received. I should not omit to state that in the month of January 1879 Mr. Hunt made application for a set of specimens, in pairs, of all coins and medals struck at the Royal Mint during the present century, in order that the Department might be represented at the International Exhibition held at Sydney in August last. By their Lordships' permission, specimens of all the Imperial and Colonial coins, and of all the medals issued, were shipped to Sydney in June last, and Mr. Hunt was authorised to retain them for permanent exhibition at the Sydney Mint.

Melbourne Mint.

The Annual Report of the Deputy Master of the Melbourne Branch of the Mint for the year will be found, as usual, in the Appendix.§

The coinage of 1879 was the largest which has been executed at Melbourne in any year since the establishment of the Victorian Mint in 1872, having amounted to 2,740,000*l.* all in sovereigns, and it will be observed that the amount of bullion received for coinage did not fall far short of the total weight of gold raised in the Colony. Two consignments of silver coin, each

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* Page 8.
† Page 10.
‡ Seventh Annual Report (1876), page 17.
§ Appendix, page 63.

of the nominal value of 50,000*l.*, made to the Melbourne Mint under the arrangements sanctioned by their Lordships, were received during the year, and of these 49,050*l.* was issued direct to the public on payment, and the remainder, 50,950*l.*, exchanged for worn coin withdrawn from circulation and sent in for re-coinage. It is satisfactory to note Mr. Broughton's statement that the result of these issues and withdrawals has been materially to improve the condition of the silver coinage in the Colony, and it may be hoped that the public will continue to avail themselves of the advantages offered to them by the arrangements above mentioned. The total amount of silver coin shipped to the Melbourne Mint during the year was 125,000*l.*, and that of bronze coin 2,000*l.*

No change took place in the establishment of the Melbourne Branch during the year, but in October last their Lordships were pleased, on a further report from the Deputy Master, to sanction certain increases of salary which he had originally proposed in 1878, and thus to give effect to all the recommendations made on the re-organisation of the Department in that year.

Coinages of foreign countries. United States.

The Report of the Director of the United States Mint for the fiscal year ended the 30th of June 1879 shows that the coinage executed during the year at the Mints of Philadelphia, San Francisco, Carson, and New Orleans consisted of 39,608,471 pieces, of the nominal value of $68,312,592, as against 56,118,382 pieces in 1878–79. Of these 2,759,421 were gold coin, 27,227,500 standard silver dollars, and 9,563,900 bronze cents. It will be seen, therefore, that the coinage of other denominations of minor coin was very small. No subsidiary silver coins were struck for issue to the public, and, as anticipated in my last Report,* there has been no resumption of the coinage of trade-dollars. The total amount of subsidiary coin issued since the passing of the Resumption Act has been $42,974,931, and the total coinage of standard silver dollars to the 1st of November 1879 was $45,206,200. I should mention that in the month of May last a Bill providing for the unlimited coinage of silver passed the House of Representatives by a small majority, which as originally introduced would apparently have authorised the coinage of silver into standard dollars on private account. It is evident that under such an arrangement a large profit would be ensured to the holders of silver, who would be able, at the present price of the metal, to bring it to the Mint and have it converted into dollars passing at a rate higher than their intrinsic value, and much confusion might have arisen had the Bill become law. A clause was, however, added to it before it left the House of Representatives providing for the retention by the Government of all profits on the coinage, and it had not up to the close of the year been discussed in the Senate. It may be assumed, therefore, that there

* Ninth Annual Report (1878), page 22.

will for the present be no further legislation in the direction indicated.

Mr. Burchard's Report contains a large amount of useful information on other subjects besides the Mint operations of the year and the present condition of the Mints and Assay Offices throughout the United States. Among these may be mentioned the production and circulation of the precious metals in America, and the production, coinage, and consumption of other countries. The Report also contains observations on the International Monetary Conference held at Paris in August 1878 at the instance of the American Government, to consider the question of "establishing internationally the use of bi-metallic money and "securing fixity of relative value" between gold and silver in coinage. Upon this subject I need offer no remarks in addition to the brief description of the proceedings of the Conference given in my Report for 1878.* I should not omit to mention, however, that the Report of the American Commissioners, which was laid before Congress in February 1879, and has since been received, brings together, in a voluminous appendix, historical and other documents bearing upon monetary questions, and completes the series of Reports furnished to their respective Governments by the delegates who attended the Conference.

Germany. The gold and silver coinage executed at the German Mints between 1871, when the reform of the monetary system throughout the Empire was commenced, and the 31st of December 1879, was as follows:—

	Denomination.	Marks.		£	
Gold.	Twenty-mark pieces.	1,268,111,720	or	63,405,586	
„	Ten-mark pieces	422,165,110	„	21,108,255	
„	Five-mark pieces	27,969,925	„	1,398,496	
					85,912,337
Silver.	Five-mark pieces	71,651,020	„	3,582,551	
„	Two-mark pieces	98,804,578	„	4,940,229	
„	Marks - -	149,898,404	„	7,494,920	
„	Fifty-pfennig pieces.	71,485,889	„	3,574,294	
„	Twenty-pfennig pieces.	30,717,510	„	1,535,875	
					21,127,869
	Marks -	2,140,804,156		or	£107,040,206

The total profit during this period on the coinage of gold was 8,231,175 marks, or 411,559*l.*, and on that of silver 41,618,870 marks, or 2,080,943*l.*

The eighth Memorandum on the German coinage,† for the year

* Ninth Annual Report (1878), page 23.

† Achte Denkschrift über die Ausführung der Münzgesetzgebung (III. Session 1880).

1879, presented to the Reichsrath by the Imperial Treasury on the 16th of February last, which gives the above figures, shows that the gold coinage of the year amounted to 46,387,060 marks, or 2,319,353*l.*, of which 23,196,000 marks, or 1,159,800*l.* consisted of double-crowns or twenty-mark pieces, and 23,191,060 marks, or 1,159,553*l.*, of crowns or ten-mark pieces. No half-crowns or five-mark pieces were struck. I mentioned in my last Report* that the coinage of Imperial silver pieces had been suspended in 1878, in consequence of the amount coined having reached the limit fixed by the Coinage Law of the 9th of July 1873, namely, ten marks per head for the population of the Empire. The silver coinage of 1879, therefore, was insignificant, having been confined to the partial re-coinage, into marks and two-mark pieces, of twenty-pfennig pieces, of which it was decided in October last that a sum of five million marks should be withdrawn from circulation. A Bill has recently been introduced into the Reichstag for increasing the silver coinage from ten to twelve marks per head of the population, and it is unnecessary to point out that, if the Bill should become law, a large proportion of the stock of old silver coin still in the hands of the German Government would be absorbed. The total amount of silver in stock is estimated, as shown in my Report for 1878†, at about 17,500,000*l.*, and it is calculated that this proposed addition to the silver currency would absorb nearly a quarter of that sum. It may be mentioned that, owing to the low price of silver, the withdrawal of the thaler coinage from circulation progressed but slowly during the early part of last year, and since May has been entirely suspended. No sales of silver on behalf of the German Government, therefore, have been made during the past twelve months.

At various times during the year statements have appeared implying that an alteration of the German Coinage Laws, involving a return to the principle of the double standard of gold and silver, was under the consideration of the Imperial Government. No official steps, however, have actually been taken in this direction, and in reply to an interpellation in Parliament in June last, Prince Bismarck declared that the interruption in the sales of silver was nothing but a financial measure, a change in the Currency Act tending towards a double standard not having been in contemplation.‡

France, Belgium, Italy, Switzerland, and Greece.

The "Latin" Monetary Convention of 1865 having expired on the 31st of December 1879, the new Convention of the 5th of November 1878, the provisions of which were discussed in my last Report,§ came into force on the 1st of January 1880. In accordance with the terms of the latter, subsidiary silver coins struck in Italy ceased to be legal tender in the other States of the Union from the beginning of the current year. Some modifica-

* Ninth Annual Report (1878), page 27.
† Ninth Annual Report (1878), page 26.
‡ See "Economist," 28th June 1879, page 737.
§ Ninth Annual Report (1878), page 27.

tions were introduced, in July last, into the arrangements made between the French and Italian Governments for the withdrawal of these coins, but these are unimportant and in no way affect the main principle of the Convention, which suspends the coinage of silver five-franc pieces throughout the contracting States, while leaving that of gold free. It should be observed that, by the complete cessation of the coinage of silver five-franc pieces in France and the other countries forming the Latin Union, the system of the double standard has been practically suppressed, and it may be added that that system no longer in fact exists in any part of the world.

The French coins struck at the Paris Mint during the year 1879 were the following:—

Denomination.		Francs.	£	
Gold.	One hundred francs	3,860,100	or 154,404	
„	Twenty francs	24,610,540	„ 984,422	
				1,138,826
Bronze.	Ten centimes	200,000		8,000
„	Five centimes			
„	Two centimes			
„	One centime			
	Francs	28,670,640	or	£1,146,826

Besides the above, there have been coined at the Paris Mint twenty-franc pieces, of the value of one million francs, bearing the effigy of the reigning Prince of Monaco, and twenty-dinar (twenty-franc) pieces of the same value for the Principality of Servia. There has been no issue of silver coin during the year.

The monetary system of dollars and cents, generally in use throughout the East, having been adopted in French Cochin China, the Government of that Colony caused the following subsidiary coins to be struck at the Paris Mint during the past year:—

Denomination.		No. of Pieces.
Silver.	Fifty-cents	180,000
„	Twenty-cents	350,000
„	Ten-cents	400,000
Bronze.	Cents	500,000
		1,430,000

In addition to these coins, 20,000,000 "sapèques," or bronze pieces, representing the $\frac{1}{500}$th part of a dollar, were struck for the same Colony. These pieces weigh two grammes, and have a hole in the middle, like the Hong Kong mil. At the same time, the Colony was authorised to adopt a silver trade-dollar, of the weight of 27·215 grammes, or as nearly as possible 420 grains, and of the fineness of 900 parts in 1,000. The dies for these

coins, which are to be struck only at the Paris Mint and on private account, have been prepared and are ready for use, but as yet no order for a coinage has been received. I may observe that it is very improbable that any issue of such dollars will actually take place, as, for the reasons given in a former Report,* it is difficult to see how a coin struck in Europe at considerable expense and sent out to the China seas can compete with Mexican and other dollars produced at far less cost and already current throughout the East.

A decree dated the 2nd of April 1879 substituted the French coinage system for the currency of the Island of Réunion, which had before consisted of foreign coins, including the rupee of India and its sub-divisions. It would appear, however, that much inconvenience has been caused by the change, and that the difficulties encountered in enforcing the provisions of the decree may not improbably lead to its withdrawal or modification. I need not remind their Lordships that in the neighbouring Island of Mauritius the British Imperial system of coinage was abolished in 1876,† and the currency of the rupee and its sub-divisions substituted for it.

In February 1879, I received a visit from Monsieur L. Sudre, Chef des Bureaux in the Paris Mint, who had been charged by his Government to make inquiries into the English Mint system, with a view of ascertaining whether the contract system, which had always existed in France, should be maintained, or whether it would be preferable to transfer the actual manufacture of coin to Government Officers. I was able to give M. Sudre exact information as to the details of coining in this country since the re-organisation of the Mint in 1851, when the contract system was abolished, and to point out the advantages entailed by direct supervision on the part of Government Officers of the several operations of coinage, and by the concentration of responsible authority in the hands of as few persons as possible. On the 31st of July last a law was passed by the French Legislature, directing that the coinage should for the future be executed by Government Officers under the control of the Minister of Finance, and that the new arrangement should come into force within six months of the promulgation of the law. It was at the same time provided that a decree should be issued making regulations for the receipt of gold and silver for coinage; that "bons de monnaie," free of stamp duty, should be given in exchange for metal thus deposited; that a Commission of Control should be created, composed of nine members appointed by public bodies, to conduct a yearly examination, similar to the trial of the Pyx in this country, of specimens both of new coins set apart for the purpose and of coins taken from circulation; and finally that yearly reports should be made as to

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* Eighth Annual Report (1877), page 12.

† See Seventh Annual Report (1876), page 11.

the condition of the metallic circulation and the operations of the Mint. The decree issued under this law, and dated the 31st of October last, fixed the Mint charge at the old rate of 6 francs 70 centimes per kilogram for gold, and 1 franc 50 centimes per kilogram for silver, and gives full directions as to the details of the new administration. It also directs that the period for which "bons de monnaie" are to be issued is to be fixed by the Minister of Finance, but is in no case to exceed one month. Copies of the law of the 31st of July and of this decree will be found in the Appendix.* Before the close of their session in August last, the Chambers voted a credit for the re-arrangement of the works of the Paris Mint, which will for the future be the only Mint in France. For some years the Mint at Bordeaux had been the only provincial Mint which had remained open, and it also has been closed since the 1st of January 1880, from which date the new law has been in operation. Since that time, owing to the structural alterations in progress, no coinage has been executed at the Paris Mint, which it is believed will not be in a position to resume work until the latter part of the current year.

Austria-Hungary.

During the latter part of 1878 and the first quarter of 1879 the imports of silver into Austria-Hungary were very large, and, as the low price of the metal made it a profitable transaction to send it to the Austrian and Hungarian Mints for coinage, private persons availed themselves to a very large extent of the facilities offered for the conversion of bullion into coin. In March 1879 the Government found it necessary to prohibit further coinage on private account, and from that date to the end of the year coinage for the State only was executed. By the 31st of December last the silver coinage of the Vienna Mint alone had reached 4,800,000*l.*, and as between August 1878 and November 1879 2,000,000*l.* in old silver coin had returned to the country, the silver circulation had increased by nearly 7,000,000*l.*†

In May last two specimens of an "historical coin," of the value of two florins, struck in commemoration of the silver wedding of the Emperor and Empress of Austria, were received from the Foreign Office and forwarded to this Department by their Lordships' directions. They have been placed in the Mint Museum.

Holland.

There has been no change during the past year in the position of the monetary question in Holland or its Colonies; and in consequence of the continued suspension of the coinage of standard silver pieces, the amount of coin issued from the Mint at Utrecht has been very small. I append, as in former years, a statement of the coinages executed, which shows that the substitution of bronze for copper coin had been completed in 1878, and that the issues

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* Appendix, page 67.

† *See* "Pall Mall Gazette," 17th March 1880, page 9.

in 1879 were confined to small amounts of gold coin and subsidiary silver pieces:—

Denomination.		No of pieces.	£
Gold.	Ten-florin pieces -	581,036 or	484,197
	Ducats (5·75 florins)	20,103 „	9,633
Silver (subsidiary coinage).	Ten-cents -	1,000,000 „	8,333
	Five cents -	200,000 „	833
	Total - -	1,801,139 „	502,996

I mentioned in my last Report* that a law had been passed on the 10th of December 1878 by the National Assembly of Servia, authorising the Servian Government to make arrangements for the practical adoption of the monetary system of the Latin Union throughout that country. I have now to add that in September last application was made by the Servian Minister of Foreign Affairs to Her Majesty's Government, through the British Minister at Belgrade, to authorise the execution of the bronze coinage required, in this country, under the supervision of the Mint. The contract for this part of the new coinage having been granted to Messrs. Ralph Heaton and Sons, of Birmingham, 10-para and 5-para pieces, of the nominal value of 1,200,000 dinars, or 48,000*l.*, were struck by that firm during the months of November, December, and January last, and forwarded to Servia under certificates from this Department that the work had been correctly executed in regard both to the weight and composition of the coins. Servia.

The Commissioner of the Imperial Mint at Osaka has issued, as usual, a Report on the operations of the Department under his control for the year ended the 30th of June 1879. The number of coins struck during the year was 88,424,123, of which 92,073 consisted of gold 5-yen pieces, 5,008,241 of silver pieces of different denominations, and the remainder, 83,323,809, of copper coins. Since the issue of the proclamation of the 26th of November 1878, referred to in my last Report,† which suspended the coinage of the trade-dollar of 420 grains, and directed the resumption of the coinage of the yen, or dollar of 416 grains, as originally issued, coins of the latter denomination only have been struck, the number of trade-dollars issued in the earlier part of the Mint year having only amounted to 32,717. The number of yen struck during the remainder of the year was 1,879,354. Of the subsidiary silver coins, 10-sen and 5-sen pieces only were struck, and in December 1878 the coinage of all silver tokens was suspended. It will have been seen, on the other hand, that the coinage of copper during the year was very large. This coinage, which is of the same composition as European bronze coin, namely Japan.

* Ninth Annual Report (1878), page 31.
† Do. Do.

an alloy of copper, tin, and zinc, has been undertaken in order to effect the withdrawal of the "tempo" and other kinds of "cash" hitherto in circulation, from which it is hoped that the whole of the new coin may soon be produced, instead of from metals purchased in the market. Full details are given in Mr. Ishimal's Report as to the steps taken in the Chemical and Metallurgical Laboratory to ascertain the exact composition of the "cash," and in the Copper Refining and Melting Departments to convert it into bars for coinage. Particulars are also given of the annual trial of the Pyx held on the 25th of June 1879, to ascertain the weight and fineness of the gold and silver coin issued during the preceding year, together with the last reports made by the Assayers of the British and American Mints on the Japanese coin annually submitted to them for examination. The results are in all cases satisfactory. Mr. Gowland still retains the appointment of Chemist, Assayer, and Technical Adviser in the Osaka Mint, and Mr. MacLagan that of Engineer.

Argentine Republic.

On the 13th of June 1879 a project of law was submitted by the Argentine Minister of Finance to the National Congress for the establishment of a coinage for the Republic. The coins current in Buenos Aires and throughout the country have hitherto mainly consisted of the silver dollars of the South American Republics and their sub-divisions, and much inconvenience has been caused by the multiplicity of the different pieces in circulation. The Government considered it desirable, therefore, to propose a national coinage of gold, silver, and copper, of which the gold coins should be legal tender to any amount, and the silver and copper coins to the amount of ten dollars and one dollar respectively in payments exceeding twenty dollars. The law, however, which passed the Legislature on the 16th of September last made no provision for the coinage of gold, but authorised the Government to contract with the National Bank for a coinage of silver, nickel, and bronze, in pieces of the following denominations, weight, and composition :—

	Denomination.	Weight (grammes).	Composition.
Silver.	Dollar	25	900 parts of silver, and 100 parts of copper.
	Fifty cents	12·5	
	Twenty cents	5	
	Ten cents	2·5	
Nickel.	Five cents	10	85 parts of copper, and 15 parts of nickel.
	Two cents	4	
Bronze.	Cents	3	95 parts of copper, 4 of tin and one of zinc.

The coinage of silver is not to be less than 2,000,000 dollars, nor to exceed 4,000,000 dollars, and that of nickel and bronze is to be of the nominal value of 200,000 dollars, in fixed proportions of coins of each denomination. The law also lays down regulations for verifying the weight and fineness of all coin before its issue to the public, and for the gradual withdrawal of foreign coin from circulation, but appears to contain no provision restricting the

amount of subsidiary coin to be tendered in any one payment. It is understood that tenders have been called for by the Government, through the National Bank, from European firms for the execution of the new coinage.

Mint administration of the past ten years.

In concluding this Report, I may perhaps be allowed to show what have been the general results of the changes effected in the organisation and practice of the Mint during the past ten years, and how they have conduced to the efficiency of the Department.

In a minute dated the 7th of January 1870, their Lordships recorded their opinion that no advantage was derived from the appointment of two highly-paid Controlling Officers, the "Master" and the "Deputy Master and Comptroller," which would not be equally afforded by entrusting the practical superintendence of the Mint to a single well-qualified officer. They directed, therefore, that the Mastership should be held by the Chancellor of the Exchequer for the time being, and that the actual administration of the Department should be placed in the hands of the "Deputy Master and Comptroller."

The practical operations of minting naturally divide themselves into the mechanical production of accurately adjusted discs of metal, and the preparation of alloys in which the relation between the precious and base metals must in all cases be most scrupulously maintained. In order that the work of the Mint under these two heads may be efficiently performed, it is essential that responsibility should be placed in as few hands as possible, and the important changes of establishment in 1870 had this object in view. In that year the Coining and Die Department, which had previously been under the control of a Coiner and Assistant Coiner, and the Melting Department, which had been under separate management, were finally united under one "Superintendent of the Operative Department," who was made responsible for all the mechanical operations incidental to the production of coin, and for the maintenance of all the machinery in an efficient state. Before the close of the same year the duty of determining the fineness of all bars melted in readiness for coinage and of coins taken from all coined work, hitherto performed by Non-resident Assayers, was entrusted to the Chemist of the Mint, who had been appointed, after the death of the late Mr. Graham, to advise on questions of a metallurgical and chemical character. No change was made in the position of the Assayer charged with the duty of assaying ingots when first imported into the Mint for coinage.

I need not describe in detail other changes of establishment and reductions of expenditure effected in 1870, and it is only necessary to state that their immediate result was a large annual saving, and that, although the work of the Mint has since been far heavier and it has been necessary to add both to the clerical staff and the number of Workmen, the average expenditure of the last ten years has not shown any sensible increase. It has already been shown*

* Page 11.

that the transactions of the Mint during the last eight years have resulted, after the payment of all expenses whatever connected with the Department, in a net profit to the State of over 21,000*l.* a year.

A step was taken in 1870, of which the necessity had long been felt, and which has been attended with most beneficial results. Until that year the regulations governing the Mint and the coinage were contained in numerous Acts of Parliament, Mint Indentures, Orders in Council, and Treasury Regulations, and much uncertainty prevailed respecting them. It was considered desirable, therefore, to embody all such regulations in one Act of Parliament, and with this view the Coinage Act (33 Vict. cap. 10) was passed in April 1870. This Act consolidated the law relating to the coinage and the Mint, and, while giving the Treasury power to make regulations for the general management of the Department, prescribed the weight and fineness of each coin of the realm, and showed concisely what were the obligations of the Government and the public respectively in regard to the coinage.

In one particular the provisions of the Act seriously increased the responsibility of the Mint. Under the Mint Indenture in force at the passing of the Act, each pound troy of coins, weighed or assayed in bulk, was pronounced to be legally correct, if found to be within certain prescribed limits of weight and fineness. The Act, however, not only reduced the "remedy" both of weight and fineness in the case of gold coin, but, by specifying the actual legal weight which each individual coin, whether of gold, silver, or bronze, should hold, rendered it necessary that each piece, instead of each pound weight of pieces, should be within the limits of weight assigned to it. As any gold or silver coin struck in the Mint is liable to be separately weighed or assayed at the trial of the Pyx, it is unnecessary to point out that extreme vigilance can alone ensure a compliance with the provisions of the law. I may here mention that, at the nine trials of the Pyx which have been held since the passing of the Coinage Act, no gold or silver piece has been found incorrect in weight, and that the fineness of the coins examined, whether separately or in bulk, has on all occasions proved to be remarkably close to the precise legal standard. It is important to note that the Act renders it necessary that a trial of the Pyx should be held "at least once in every year in which coins have "been issued from the Mint," and that the Order in Council passed in 1871, under the provisions of Section 12 of the Act, gave minute directions as to the conduct of future trials, and has led to uniformity and greater simplicity of procedure. The Act further provided for the preparation from time to time of standard trial-plates of gold and silver, by which the fineness of the coin might be verified. I pointed out in my first Annual Report that the gold plate prepared in 1829, and still in use, was considerably below standard, and further that it might be well to supplement it with a plate of fine gold. Their Lordships having requested the Board of Trade to take the necessary steps for the preparation of

new standard plates both of gold and silver, and for supplementing them with plates of fine metal, it was decided that the Chemist of the Mint should undertake the preparation of the plates, and that the Goldsmiths' Company should be requested to verify their accuracy. I have already referred to the importance of this work, which was completed in 1873.

Notwithstanding the care and skill which have at different times been bestowed upon designs for coins, and the wealth of art literature generally, it is remarkable that but little attempt can be said to have been made to set forth in a convenient form the principles upon which excellence of design in coins must in all cases depend. I ventured, therefore, in my Annual Reports for 1874, 1876, and 1877 to present autotype illustrations, first, of medals of undoubted beauty, secondly, of a series of typical portrait coins of this and other countries, and thirdly, of designs for reverses of coins which might serve to show the phases through which decorative art as applied to coinage has passed in ancient and modern times. To these illustrations were added brief descriptive remarks on the influence which art has from time to time exercised on coinage, with notes as to the sources from which fuller information could be gathered. It may be hoped that the facts thus collected may have been useful in calling attention to the question of design, which I venture to think has during the last forty years been somewhat neglected.

The Annual Reports have also contained, each year, besides statements in detail of the work performed by the Mint and a full account of its proceedings, notes on the Mints and coinages of foreign countries, on monetary Conventions and Conferences, and generally on such questions of interest as have from time to time arisen in connection with monetary science. The Reports made each year by the Deputy Masters of the Branch Mints at Sydney and Melbourne are printed with the Annual Reports of this Department, and the establishments of both Branches have, like the establishment of the Mint itself, been brought into harmony with the Orders in Council which have at different times been passed respecting appointments in the Civil Service, all Clerkships being filled by open competition, and other appointments under certificate from the Civil Service Commissioners. The arrangements for the management of the Branch Mints have also been much simplified during the past ten years, and the design of the coins issued by them has been assimilated to that of sovereigns and half-sovereigns struck in this Department.

Throughout the period which has elapsed since the reorganisation of the Department in 1870 their Lordships have been pleased to recognise the efforts which have been made to promote its efficiency and year by year to improve its administration and practice; and I hope I may be allowed to express my belief that, with a staff well qualified for their duties and discharging them zealously, the progress made will be maintained. I must at the same time repeat, as has been said in many former

Reports, and has been fully admitted by successive Boards of Treasury, that the obsolete mechanical resources of the existing Mint are wholly inadequate to meet even the ordinary requirements of the coinage, and that the Department will not have been placed in a thoroughly efficient condition until it has been provided with new buildings and machinery.

I have the honour to be,
Sir,
Your obedient Servant,
C. W. FREMANTLE,
Deputy Master of the Mint.

The Secretary,
Treasury.

Royal Mint, 6th May 1880.

APPENDIX.

No. I.

MEMORANDUM BY MR. HILL, SUPERINTENDENT OF THE OPERATIVE DEPARTMENT.

MELTING HOUSE.

The operations of the Melting House during the past year have not been marked by any special feature, except that the weight of silver cast, viz., 4,603,343 ounces, or about 141 tons, was slightly in excess of the average, and that of this quantity no less than 1,600,724 ounces consisted of worn silver coin withdrawn from circulation in the United Kingdom and the Colonies.

In consequence of the Bank of England sending no gold to the Mint for coinage until the month of November, the weight of that metal melted was comparatively insignificant, amounting to only 69,667 ounces.

The weight of bronze melted was 105 tons, which is somewhat above the annual average.

Interesting experiments have been made during the year, under my directions, with one of Fletcher's Patent Annular Furnaces, placed at the disposal of the Department by the Directors of the Patent Plumbago Crucible Company. This furnace is especially constructed for the rapid and economical melting of metal by means of a well-diffused blast, producing perfect combustion of fuel and intense and equable heat. It consists of two concentric shells of cast iron, of which the internal one is lined with fire-clay, while the external one is fitted below with a door opening downwards, upon which, when closed, a plumbago stand perforated with small holes rests, in order to support the crucible within the inner casing. This solid door takes the place of the fire-bars of an ordinary furnace, and, being concave, retains any metal which may possibly be spilt; and it will be seen therefore that, when the cover of the furnace is placed in position, no air can reach the fire within, except that which is supplied by the blast, heated by its admission between the two shells of the furnace, and entering at the bottom of the inner one.

The following tabular statements show the time occupied in melting silver and bronze by this furnace, and the quantity of coke consumed during the operation :—

EXPERIMENTAL SILVER MELTING in FLETCHER'S BLAST FURNACE.

	Weight of Metal charged into the Pots.	Time occupied in melting in Blast Furnace.		Time occupied in melting in present Furnace.	REMARKS.
	oz.	hours.	minutes.		
1st day	Pot 1. 2,888	0	41		All cold.
	„ 2. 3,040	0	44		Same crucible replaced.
	„ 3. 2,960	0	44		Do. do.
2nd day	„ 1. 3,236	0	50		All cold.
	„ 2. 3,236	0	47		Same crucible replaced.
	„ 3. 3,236	0	32		Do. do.
3rd day	„ 1. 2,880	0	58		All cold.
	„ 2. 2,880	1	0		Same crucible replaced.
	„ 3. 2,880	0	45		Do. do.
	„ 4. 2,880	0	40		Do. do.
4th day	„ 1. 2,880	0	42		All cold.
	„ 2. 2,880	1	0	1 hour 35 minutes	Same crucible replaced.
	„ 3. 2,880	0	41		Do. do.
5th day	„ 1. 3,000	0	56		All cold.
	„ 2. 3,000	1	2		Cold crucible used.
	„ 3. 3,000	0	50		No. 1 crucible replaced.
	„ 4. 3,000	0	48		No. 2 do.
6th day	„ 1. 3,250	1	3		All cold.
	„ 2. 3,200	1	0		Same crucible replaced.
	„ 3. 3,000	0	52		Do. do.
	„ 4. 2,900	0	46		Do. do.
	„ 5. 3,000	0	52		Do. do.
	„ 6. 2,900	0	48		Do. do.

The average quantity of coke consumed was 75 lbs. per pot.

EXPERIMENTAL BRONZE MELTING in FLETCHER'S BLAST FURNACE.

	Weight of Metal charged into the Pots.	Time occupied in melting in Blast Furnace.		Time occupied in melting in present Furnace.	REMARKS.
	lbs.	hours.	minutes.		
1st day	Pot 1. 91 -	1	30		All cold.
	„ 2. 112 -	1	15		Same crucible replaced.
	„ 3. 210 -	1	15		Do. do.
2nd day	„ 1. 210 -	1	30		All cold.
	„ 2. 202 -	1	0	2 hours 15 minutes	Same crucible replaced.
	„ 3. 172 -	1	5		Do. do.
3rd day	„ 1. 202 -	1	13		All cold.
	„ 2. 202 -	1	15		Same crucible replaced.
	„ 3. 191 -	1	30		Do. do.

The average quantity of coke consumed was 95 lbs. per pot.

The average revolutions of the fan were 2,000 per minute, but, as the rate of revolution was not constant, considerable fluctuations were observed in the temperature of the furnace, sufficient to account for the discrepancies shown in the times of melting, and the amounts of metal operated upon, under varying conditions. These experiments prove, however, that the Fletcher furnace melts much more quickly than those at present in use at the Mint, while the amount of coke used is about the same in each case. At the same time, as there are several other furnaces, the capabilities of which have not been tested by this Department, I am not as yet in a position to recommend any alteration in the system of melting now in force.

COINING DEPARTMENT.

In addition to the Imperial coinage, particulars of which are given, as usual, in the table appended to this Memorandum, two Colonial coinages have been executed, one for Hong Kong, in 20-cent, 10-cent, and 5-cent pieces in silver, and one-cent pieces in bronze, of the total number of 1,600,000, and the other for Cyprus, consisting of piastre, half-piastre, and quarter-piastre pieces, in bronze, of the total number of 650,000.

On the importation of light gold coin in November last, experiments were made in the Weighing Room with a view of ascertaining the exact

loss by re-melting, and the average loss in weight sustained by each sovereign and half-sovereign during the time of its circulation. The dirt adhering to the coins was effectually removed by washing, and the difference in the weight of the coins before and after this washing was found to be 0·08 ounce on 1,000 sovereigns, and 0·043 ounce on 1,000 half-sovereigns. The loss to the Mint, therefore, from the purchase of dirt as metal amounts to about 311*l.* per million sovereigns, and about 334*l.* per two million half-sovereigns.

Machinery Department.

This Department has been maintained in good working order during the year without the payment of any considerable amount of wages for "over-time." It became necessary to employ a private firm to repair the cold-water pump of the 40 horse-power engine and the die-sinking press, the repairs needed being such as could not be effectually executed by the Mint. With these two exceptions, all defects arising during the year have been made good by the Artificers. Coining operations were suspended from the 29th of September to the 1st of November, for the purpose of examining, cleaning, and repairing the engines, machinery, and boilers.

In the Melting Department a small mill for grinding "sweep" from the gold coinage, with shafting, &c., has been fitted up, as well as the blast furnace above referred to, and the various sets of moulds used have been kept in proper order. A complete set of new moulds for shilling bars has also been completed.

The Department has sustained a serious loss during the year by the death of Mr. John Murray, Overman of Artificers, whose thorough practical knowledge and ready assistance have at all times been of great service to the Mint.

Die Department.

The Die Department has furnished 3,012 matrices, punches, and dies, for the Imperial coinage, including those supplied to the Branch Mints at Sydney and Melbourne; and has produced 359 Colonial and other dies, including the matrices, punches, and dies for a bronze coinage for Cyprus. The number of war medals for the army and navy made during the year has amounted to 3,391, and that of the bars and clasps to 3,790 and 183 respectively. The number of bars and clasps affixed to medals has been 2,949.

The usual medals for the Royal Society and the University of London were also prepared, and 45 gold and silver medals for the Foreign Office, in addition to 10 silver and 18 bronze medals given by the Board of Trade for saving life at sea.

About 70 proofs of Colonial coins were struck for the collection of the Colonial Office, and a duplicate set of coins and medals, amounting to 319 pieces, was prepared for the Sydney International Exhibition held in August last.

In the month of April last the appointment of Resident Engraver became vacant by the death of Mr. Minton, when a special inquiry was made into the duties performed by that officer. The most important work connected with engraving, perfecting, and examining dies, matrices, and punches, is performed by the Chief Engraver of the Mint, and the only duties which the Resident Engraver was called upon to perform consisted in "punching in" defective letters, and generally examining the dies before they were placed in the coining-presses.

The system of perfecting dies after they have been sunk has always been attended with a certain amount of risk of error in "lettering," and I recommended that all matrices and punches should themselves be perfected, in order that a working die sunk by means of a punch should be as perfect as the original matrix from which the punch was in the first instance derived. This suggestion was adopted, and has since been carried out. The office of Resident Engraver, being thus rendered unnecessary, has been abolished, and a skilled Artificer has been appointed to the Die Department to prepare the additional number of punches required under the new arrangement.

Experiments were made during the year in preparing dies on two different systems, viz., by forging under the steam-hammer, and by hand-forging.

The results obtained were as follows :—

Forged by Steam-Hammer.

No. of die.	No. of pieces struck.
1	94,635
2	42,060
3	77,110
4	119,170

giving an average number of 83,244 pieces per die.

Forged by Hand.

No. of die.	No. of pieces struck.
1	22,432
2	18,927
3	69,399

giving an average number of 36,919 per die.

It will be seen that the dies forged under the steam-hammer have struck a greater average number of pieces than those prepared by the other method. The dies were all used in the lever-presses, in order that the conditions under which they were worked should be in all respects identical. The improvement indicated in the tabular statement annexed, as usual, to this Memorandum, of the number of coins struck and dies used during the past year, can therefore be traced to the use of the steam-hammer in forging, but it should be mentioned at the same time that the quality of the steel has somewhat improved.

Experiments are also in progress with a view to ascertain what results would be obtained by simply cutting a piece of steel from the bar and turning it at once into shape, without any hammering whatever.

Work of the past Ten Years.

The expiration of ten years since the re-organisation of the Mint on its present footing and the first issue of Annual Reports on the work executed in each year, affords a favourable opportunity of taking a retrospect of the alterations and improvements effected in the Operative Department during that period.

From the commencement of the present century until the year 1870, both gold and silver bars for coinage were cast an inch in thickness. This made it necessary to anneal them in the Rolling Room, once in the case of sovereign bars, and twice, or even three times, in the case of bars for other denominations of coin. Blanks were also annealed and blanched before coinage.

In 1870, the thickness of gold bars was reduced to half an inch, while annealing in the Rolling Room was entirely dispensed with in the case of fillets for sovereigns, and was only performed once during the rolling of fillets for half-sovereigns. In 1875, the bars were further reduced to a thickness of $\frac{3}{8}$ths of an inch, at which they now remain, and experience has proved that the change has effected a considerable saving both of time and labour.

In 1873, the moulds for casting half-crown and florin bars were altered from 1 inch to $\frac{3}{8}$ths of an inch, and in 1875, the shilling moulds were similarly reduced.

The object in view in reducing the thickness of gold and silver bars was to carry out my suggestion, made in 1869, that the practice of blanching the blanks should be discontinued, and the whole of the gold coinage of the last ten years, and a large proportion of the silver coin struck, has been produced from unblanched blanks.

In 1878, an alteration was made in the width of the bronze bars, so that by a re-arrangement of the cutters any denomination of bronze blanks can now be cut from the same width of fillet.

The crucibles originally used for silver melting were of cast iron, but these were superseded in 1853 by wrought iron pots, which were retained until the year 1870, when plumbago crucibles were substituted for them. The introduction of these crucibles has been attended with the greatest success, and the advantages derived from their use may be briefly stated. They are cleaner, cheaper, and more easily worked; and, being closer in texture than iron pots, retain but little metal, which can easily be recovered by grinding. It is possible, therefore, to ascertain with accuracy the result of each day's work.

The weight of gold melted during the past ten years has amounted to 30,279,671 ounces, or about 927 tons; the weight of silver to 48,415,778 ounces, or about 1,482 tons; and that of bronze to 884 tons.

Machinery has been erected at various times during the last ten years to facilitate the out-turn of work. The principal additions to the plant have been a cutting machine erected in 1872, in the Gold Melting-house, for removing the defective ends of bars with a view to remelting them at once, and also for cutting up "stopped" bars to a convenient size for remelting. In 1875, a similar machine was erected in the Silver Melting-house, where, during the same year, three circular files, with shafting and brackets, were fitted up for trimming the bars. A circular file has also been placed in the Gold Melting-house.

Advantage was taken of a long suspension of coining operations in 1876 to replace the grinding mills used for crushing crucibles, &c. by others of modern construction. Three of the latter are now in use, and are found cheap and convenient.

The adoption of thin bars has considerably lessened the labour of rolling, and reduced the strain upon the 40 horse-power engine, which drives the machinery of the Rolling Room. In 1876, however, the first motion wheel of the engine, which had been at work since 1810, and had of late years been a constant source of trouble and anxiety, broke into pieces, and was replaced by a new one fitted with gun-metal cogs.

In my Memorandum for 1872 I drew attention to the antiquated cutting-out machine then in use, in which the fillet to be cut is guided entirely by hand. Since that date four self-acting cutting-out presses have been introduced, and blanks are now produced with far greater rapidity and accuracy.

To show the correctness of the work performed in this Department, it is merely necessary to state that the total weight of the gold coinage of 6,500,000*l.* completed in 1871 was found to be of the exact standard

prescribed by law, and that of the coinage of 24,500,000*l.* finished in 1873, showed a divergence from the standard of only two-thousandths of an ounce.

A complete change has been carried out since 1870 in the system of annealing blanks, which were originally placed in cast-iron pans, and allowed to cool in contact with the air. The blanks were then placed in dilute sulphuric acid to remove the easily soluble oxide of copper, so that a film of pure metal might be left on the surface of the blanks in its place. This film, as it wore off in circulation, soon showed in places the real colour of the alloyed gold or silver, and the appearance of the coins was impaired. Iron pans were in 1870 superseded by copper tubes, charcoal being placed at the top and bottom of the tubes, so as to prevent any change by oxidation in the original colour of the blanks, and the tubes containing them being rapidly cooled by plunging in water. In 1877 plumbago pans were introduced, and were found to be far more durable, as well as less costly than the copper tubes; and gold, silver, and bronze blanks are now all annealed in these pans.

In the year 1872, when a great demand for coin arose, it was necessary to obtain more coining power, and four Uhlhorn lever presses were hired from Messrs. Ralph Heaton and Sons, and fitted up in this Department. The work of these presses was so satisfactory, that one was purchased in 1875, and its performance during 1876 was compared with that of the screw presses. The results were found to be greatly in favour of the new press, both as regards the number of pieces coined per pair of dies, and the reduced number of brockages or faulty pieces produced. Three more lever presses have since been bought, and are now at work.

The total number of Imperial coins struck during the past ten years has been 325,485,766, and the number of dies used in their production has been 25,571. The average number of pieces struck per pair of dies has therefore been 25,457.

In the Weighing Room several improvements have been made in the automaton balances, by which greater accuracy in weighing the coin has been obtained. On the re-issue of half-crowns in 1874, it became necessary to make certain changes in the balances entailing a considerable amount of work, no coin larger than the florin having been previously weighed by them. The value of the good coins issued from the Weighing Room during the last ten years has been 47,894,734*l.* 14*s.* 5*d.*, or an average of 4,789,473*l.* 9*s.* 5*d.* per annum.

In the year 1870, an Overman was appointed to supervise the work performed by the Artificers, Smiths, Enginemen, &c., and the staff of mechanics was brought together into one shop. This arrangement has been attended with great advantage to the Mint, and has resulted in a saving of about 1,400*l.* a year, most of the repairs to the engines and machinery being now executed by Mint artificers instead of being entrusted to private firms, while the only special expenditure incurred in connexion with it has been an outlay of about 500*l.* for planing, shaping, and drilling machines, and for a small steam-hammer, without which it would be impossible to produce the more expensive appliances.

In the year 1871 a "Balance Mechanician" was appointed to undertake the repairs and adjustment of scales and weights. The balances are now adjusted daily, and are repaired exclusively in the Mint, and the expenditure under this arrangement is much less than was the case when a periodical supervision only was exercised by private firms of balance makers.

In the year 1870 the furnaces used for annealing and hardening dies were altered so as to reduce the size of the fire, and to make

the process of heating the dies more gradual. This change, while effecting a great saving in fuel, has materially improved the quality of the dies. In the same year the system was introduced of softening the worn dies, and resinking them. No less than 4,955 dies have been thus treated during the past ten years. An important alteration has also been made by shortening the necks of the dies, so as to increase their durability and greatly reduce the number used in the coining-presses.

All matrices, punches, and dies required for coinages executed and war medals struck within the Royal Mint, in addition to the dies sent to the Branch Mints at Sydney and Melbourne, are prepared in this Department; and during the past ten years there have also been manufactured matrices, punches, and dies for new coinages for Uruguay, Japan, the Straits Settlements, Prince Edward Island, the States of Colombia, Mauritius, Jersey, and Cyprus, together with two dies for Board of Trade medals, one die for the "Copley" medal of the Royal Society, special reverse dies for the "Arnott" medal, and the dies for money-weights required by the Standards Department of the Board of Trade.

In the year 1874, a new and very important duty devolved upon the Die Department, namely, the manufacture of all the bars and clasps for war medals. Up to that year this work had been performed by contract, an arrangement which gave rise to numerous complaints of defective workmanship and delay in the delivery. It is satisfactory to report that this work, which involves no less than forty different operations, has been successfully executed, and that the appearance of the medals has at the same time been much improved. Since it was first undertaken, no less than 51,391 bars and 11,407 clasps have been manufactured, and 41,854 bars and 5,372 clasps affixed to medals.

The total number of war medals struck during the ten years, including medals for the New Zealand, Abyssinian, and Ashantee campaigns, has been 101,690. In 1876, the Mint undertook to provide the gold and silver medals presented by the Foreign Office to seamen of other nations for saving the lives of British subjects, and since that time 41 gold and 143 silver medals have been supplied. The following medals have also been prepared:—

Forty-six for the Royal Society, 146 for the University of London, and others for the Royal College of Surgeons and Royal Engineers' Institute.

Sets of medals and coins have been made for the Museum of the Public Library at Melbourne, and for the Sydney Exhibition. Specimens of certain Colonial coins have been struck for the Museum of the Paris Mint, and various coins and medals to complete the collection of this Department.

I have also, in conjunction with Mr. Roberts, considered what would be the best arrangements for Mint buildings, and several plans have been prepared in view of the removal of the Mint to a new site.

I cannot conclude this brief statement of the work of the last ten years, without thanking the officers and men of the Department for the ready assistance which I have at all times received from them, and without which it would have been impossible to conduct, under unfavourable conditions, operations of so varied and complicated a nature.

ROBERT A. HILL,
Superintendent of the Operative Department.

3rd April 1880.

STATEMENT of the Number of Coins struck at the Royal Mint during the Year 1879.

Denomination.		Number.	Nominal Value.		
			£	s.	d.
IMPERIAL:—					
Gold:	Sovereigns	20,013	20,013	0	0
„	Half Sovereigns	35,201	17,600	10	0
Silver:	Half Crowns	901,356	112,669	10	0
„	Florins	1,512,247	151,224	14	0
„	Shillings	3,611,507	180,575	7	0
„	Sixpences	3,326,313	83,157	16	6
„	Fourpences (Maundy money only)	5,202	86	14	0
„	Threepences	3,144,753	39,309	8	3
„	Twopences (Maundy money only)	6,925	57	14	2
„	Pence (Maundy money only)	10,626	44	5	6
Bronze:	Pence	7,666,476	31,943	13	0
„	Halfpence	3,582,545	7,463	12	$8\frac{1}{2}$
„	Farthings	3,977,180	4,142	17	11
HONG KONG:—					
Silver:	Twenty Cents	24,000	1,000	0	0
„	Ten Cents	288,000	6,000	0	0
„	Five Cents	288,000	3,000	0	0
Bronze:	Cents	1,000,000	2,083	6	8
CYPRUS:—					
Bronze:	Piastres	250,000	1,388	17	9
„	Half Piastres	250,000	694	8	$10\frac{1}{2}$
„	Quarter Piastres	150,000	208	6	8
		30,050,344	662,664	3	0

STATEMENT of the Number and Denominations of Pieces coined, with the Number of Dies used in their production, during the Years 1877, 1878, and 1879.

Denomination of Coin.	1877.			1878.			1879.		
	Number of Pieces coined.	Number of Dies used.	Number of Pieces struck per Pair of Dies.	Number of Pieces coined.	Number of Dies used.	Number of Pieces struck per Pair of Dies.	Number of Pieces coined.	Number of Dies used.	Number of Pieces struck per Pair of Dies.
Sovereigns - -	—	—	—	1,517,786	70 + 69	21,839	26,453	1 + 2	17,635
Half Sovereigns - -	4,036,837	395 + 167	14,366	3,699,685	206 + 89	25,083	72,955	8 + 6	10,422
Half Crowns - -	499,768	37 + 41	12,814	1,613,363	110 + 94	15,817	997,014	60 + 45	18,991
Florins - - -	796,177	57 + 58	13,846	1,983,511	112 + 101	18,625	1,756,680	117 + 95	16,572
Shillings - - -	3,192,974	81 + 54	47,304	3,797,977	99 + 70	44,946	4,485,579	157 + 140	30,206
Sixpences - -	4,899,119	177 + 97	35,760	3,362,093	98 + 60	42,558	4,228,278	127 + 82	40,462
Threepences - -	3,283,457	284 + 94	17,373	4,120,723	297 + 131	19,256	5,444,774	224 + 128	30,936
Maundy Fourpences -	6,162	6 + 7	948	5,735	3 + 2	2,294	5,206	2 + 2	2,603
„ Threepences -	4,568	8 + 9	537	7,700	1 + 1	7,700	4,949	4 + 3	1,414
„ Twopences -	7,539	6 + 7	1,160	6,709	10 + 5	895	6,936	2 + 3	2,774
„ Pence - -	10,501	13 + 11	875	9,908	11 + 8	1,043	10,634	3 + 3	3,545
Pence - - -	9,802,987	519 + 473	19,764	2,918,417	194 + 122	18,471	7,698,278	259 + 207	33,040
Halfpence - - -	5,312,464	172 + 276	23,716	1,425,971	35 + 32	42,566	3,640,828	99 + 103	36,048
Farthings - -	—	—	—	4,041,462	209 + 111	25,259	4,035,243	128 + 114	33,349
	31,852,553	1,755 + 1,294 *3,049	20,894 (Average)	28,511,040	1,455 + 895 †2,350	24,265 (Average)	32,413,807	1,191 + 933 ‡2,124	30,521 (Average)

* Including 344 worn dies re-sunk, and again finished for coining. † Including 372 worn dies re-sunk, and again finished for coining.
‡ Including 219 worn dies re-sunk, and again finished for coining.

No. II.

Memorandum by Mr. Roberts, F.R.S., Chemist of the Mint.

I append the usual statement of the number of assays made in my Office from the 1st of January to the 31st of December 1879:—

Gold.		
Assays of bars	282	
„ coin	1,170	
Check assays on fine gold	173	
		1,625
Silver.		
Assays of bars	3,219	
„ coin	892	
Check assays on fine silver	350	
		4,461
Total number of assays made during the year		6,086

The total number of assays made during the preceding year was 9,012.

Certain of the coins struck at Sydney and Melbourne have, as usual, been assayed, and the results proved, as is always the case, that the coins issued from these Mints approximate in a remarkable manner to the exact legal standard of fineness.

I have also assayed the pyx coins of the Bombay and Calcutta Mints, as well as certain gold and silver pieces from the Imperial Japanese Mint at Osaka, where the accuracy of the coinage is well maintained, although the European staff has now been reduced to two, one of whom, Mr. W. Gowland, has charge of the purely scientific branch of the Department.

Analyses of bronze coin struck at Birmingham for the Servian Government proved that the composition of the alloy was strictly in accordance with the coinage law of that country.

Several analyses have been made of gold and silver ornaments and of bronze tools found by Dr. Schliemann in whose forthcoming work on Troy the results will be embodied.

Light Gold Coin.

It has long been known that the gold trial plate of 1829 is inaccurate, and that coins issued in accordance with it are below the exact standard of fineness prescribed by law. As the withdrawal of light gold coin is a question of growing importance, it became necessary to ascertain the amount of loss to be anticipated from the re-coinage of such pieces, and the result of an exhaustive experiment on several thousand coins proved that sovereigns issued down to the year 1851 are deficient in standard by a little more than one thousandth part, which is equivalent to a loss on re-coinage of over 1,000*l.* per million. Advantage was also taken of this opportunity for ascertaining their deficiency in weight, which proved to be at the rate of 3·04 pence per

pound sterling, and it was further found that the older coins now in circulation bear on the surface an amount of dirt for which the Department pays nearly 300*l.* per million on their being re-imported for coinage.

"Flashing" of Gold Assays.

Dr. A. D. van Riemsdijk, of the Utrecht Mint, has, during the past year, made an important contribution to science in connexion with minting. He has suggested an explanation of the flashing which attends the solidification of cupelled buttons of gold and silver, and has supported his view by experimental evidence of much interest.* Gold and its alloys with silver or with silver and copper can be "superfused" if cupelled at a high temperature with lead in excess. There is a limit of temperature below which the fluid metal cannot fall without suddenly parting with its latent heat of fusion, and this re-heats the cooling globule to its true melting point, which, in the case of gold, is above 1000° C. But it is an admitted fact that liquid bodies so raised to a high degree of heat often emit a peculiarly intense light, and this light is known in the experiments in question as the "flashing," which precedes the solidification of cupelled gold. If, however, the alloy contains a minute quantity of iridium, rhodium, ruthenium, osmium, or osmium-iridium, the metals of the platinum group which are non-malleable, refractory to heat, and resist the action of acids, the tendency of the cupelled metal to preserve its liquid state below the melting point, and therefore to flash before final solidification, is entirely prevented. These researches point to a very simple but effective method for detecting the presence of one or more of the metals of the platinum group (except platinum and palladium) in ingots of commercial gold; for if assays made on them solidify directly they are withdrawn from the muffle, without flashing, it will be safe to conclude that the metal undoubtedly contains some of the above-named impurities.

Work of the past Ten Years.

As ten years have now elapsed since I was appointed Chemist of the Mint, it may be well for me briefly to pass in review the principal scientific questions dealt with since 1870.

European Mints.

Early in that year I was directed to undertake, in company with the Deputy Master of the Mint and Mr. J. M. Napier, an inspection of European Mints, in order to ascertain what special arrangements in force abroad it might be well to adopt in this country. It would be difficult to overrate the value of the information gathered, as it in many cases formed the basis of suggestions with regard to the operations of coinage, and, in view of the erection of the Mint on a new site, has enabled me, in conjunction with the Superintendent of the Operative Department, to prepare plans which will, I trust, be useful in the future.

Brittle gold.

In accordance with my instructions, I investigated the causes of brittleness in standard gold, and showed that the chlorine process devised by Mr. F. B. Miller, at that time Assayer in the Sydney Mint, could be employed in toughening the metal. The important fact was thus demonstrated that this process can be conducted with but trifling loss of gold in the presence of the volatile chlorides of copper and other metals.

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* Chemical News, vol. 41, p. 126.

Adjustment of blanks.

I have been much gratified to find that during the past year the adjustment of blanks by means of a suitable solvent aided by a battery, suggested by me in the first year of my appointment, is in use on a large scale in the Bombay Mint, where no less than five million pieces had, up to October last, been treated so successfully as to merit the approval of the Governor-General in Council. This process has been referred to in former reports,* and I have already pointed out that, although the plan cannot be adopted in this country, where finished coin alone is weighed, it is well adapted for the Mints of India and of the Continent, in which it is the practice to weigh blanks. As regards its final adoption in the Indian Mints, the only question would now appear to be whether it can be entrusted to native officials. There can, however, be no question of the efficiency of the process, and, as it constitutes an important advance in the operations of coinage, I may allude to a few points of interest in connexion with it.

On the Continent it is very generally the practice to adjust blanks by means of a file or cutting instrument, but in 1849 M. Dierickx, Director of the Mint in Paris, endeavoured to substitute a chemical for a mechanical treatment, by submitting the heavy gold blanks to *aqua regia*, which it was anticipated would bring them within the prescribed limits of weight by dissolving a portion of the metal. The results were not satisfactory, and the attempt was abandoned.

In 1870 some experiments on the electro-deposition of gold satisfied me that the precious metal and its alloy with copper might be removed from heavy blanks with singular regularity by means of a suitable solvent aided by a battery.† My experiments were carried on for some time and gave very satisfactory results, but the process was abandoned when it became evident that it could not profitably replace the present system under which finished coin alone are weighed, and the manufacture of good coin only is paid for.

At this time I submitted a proposal for transferring the dissolved metal to light blanks which would thus be raised to the prescribed weight, but, as I have already‡ pointed out, this was subsequently effected in 1873 by Mr. L. G. Hynes, of the Bombay Mint, quite independently of my experiments; and I may again express my gratification at the success which has attended his labours and those of Mr. Peterson, whereby the process has now been enabled to take its place as an ordinary operation of coinage. Its importance to the Indian Mints may be gathered from the fact that in one year (1879) no less than 1,300 tons of silver were converted into coin in Bombay alone, so that the saving effected by its introduction must be very considerable.

Furnaces.

No steps have as yet been taken with a view to improve the furnaces in the Melting House, and the question of adopting gas as fuel, or of employing an artificial blast, such as is used at Stockholm, still remains to be determined. Last year attention was directed§ to the Piat movable furnace, which can either be connected with a flue, worked by a fan blast, or combined with regenerative chambers, and I hoped to have been able to examine its working on a large scale. This has not been possible, but another form of furnace, patented by Fletcher and known to be excellent for certain purposes, is under trial by Mr. Hill. Colonel

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* First Annual Report (1870), p. 42 and 110. Fifth Annual Report (1874), p. 37. Ninth Annual Report (1878), p. 37.

† First Annual Report (1870), p. 110.

‡ Fifth Annual Report (1874), p. 37.

§ Ninth Annual Report (1878), p. 40.

Tennant, Master of the Calcutta Mint, has recently given details of the working of another furnace, devised by himself, in which melting can be rapidly effected, by a very moderate consumption of fuel, either with or without a blast. It will thus be seen that various data are being collected in view of the ultimate selection of the best form of furnace.

Trial plates.

I need not refer at length to the preparation of new trial plates of gold and silver to replace the inaccurate ones in use since 1829, as full details respecting them are given in the Report for 1873. I may point out, however, that the new supplementary plates of gold and silver constitute standards of reference by which the accuracy of the coinage can be rigorously tested, and I would add that during the progress of a gold coinage the fineness of the coin is now graphically represented on the system of rectangular co-ordinates, the curve thus produced forming a record of the daily results of the Mint assays, from which the standard of the coinage can at once be seen.

Reorganisation of Assay Department.

Early in 1871, on the abolition of the Non-resident Assayerships, the Assay Office for the verification of the standard of bars for coinage and of finished coin was re-established. In the new Office the conditions affecting the accuracy of assays have been investigated, and various improvements in practice have been introduced. Details as to the amount of work performed in each year will be found in the Memoranda appended to the Annual Reports, which show an aggregate of no less than 59,205 assays of gold and 50,416 of silver, or a total of 109,621. I may add that the saving which has been effected during nine years by the establishment of the new Office cannot be stated at a less sum than 10,200*l.*, which shows an annual saving of about 1,130*l.*

It has been necessary from time to time to examine and report upon a considerable number of counterfeit coins, and it has also been my duty to give evidence in five cases of offences under the Act 24 & 25 Vict. cap. 99, two of which were complicated, while a third has given rise to an important decision by the Judges of the Court for Crown Cases Reserved as to the meaning of the word "counterfeit."

In all cases, before tenders for the purchase of sweep have been accepted, samples have been assayed, and it has thus been ascertained that the difference between the amount tendered and the sum which could be realised if the sweep were treated in the Mint would not compensate the Department for the time that would have to be devoted to the operation.

The Coinage Act of 1870, by providing that the remedy of fineness shall be on the individual pieces, has greatly increased the responsibility of the Assayers, and it will be evident that with the very small staff at my disposal the resources of the Office must often have been severely tried. I have therefore the more satisfaction in bearing testimony to the care and patience with which I have been aided by Mr. F. W. Bayly, on whom so much of the routine work has devolved.

Researches.

While every effort has been made to carry on investigations of a more purely scientific nature, it has often been necessary to set aside researches in order to clear up questions of a technical character connected with the precious metals and their alloys. Distinct scientific advance has, however, been made.

The molecular arrangement and other properties of the silver-copper alloys have long been known to be interesting, and the melting points of a comprehensive series were therefore determined. It was also shown that several of these alloys are homogeneous when uniformly

cooled from fusion, a property which Levol's alloy, containing 71·8 per cent. of silver, had hitherto been alone supposed to possess*.

Mr. J. Norman Lockyer and myself† showed, as the result of a long spectroscopic investigation of the alloys of gold and copper, that it is possible to distinguish between such alloys which only differ in proportion by $\frac{1}{10000}$th part, a point of considerable importance, as it indicates that the spectroscope may be employed for quantitative analysis. We also conducted researches on the molecular constitution of metals as indicated by the absorption spectra of their vapours at very high temperatures.‡

Dr. Broch's experiments on the relation between the density and standard of gold-copper alloys have been supplemented by determinations on a more complete series than he examined. The research was extended by directing special attention to the effect of compression and annealing, and the results supply physical constants connected with gold that have long been neglected.

The passage of metals and alloys in a molten state through capillary tubes has already formed the subject of two reports to the Royal Society, and it is hoped that the work will be actively continued during the present year, as well as more recent investigations in connexion with Prof. Hughes's induction balance.

In March last Prof. Hughes published§ an account of a remarkable instrument, the induction balance, which promises to be of unusual importance in metallurgical research. Availing myself to the fullest extent of the suggestions of Prof. Hughes, I at once began a series of experiments which have afforded results of much interest. Full descriptions will be found in papers which have already been published‖ of the instrument itself and the methods by which its indications are measured, but the principle on which it depends may be briefly stated as follows.

It is found that equal and similar volumes of various metals or alloys exercise widely different effects on an electric current flowing round a coil of wire. The balance of two rapidly intermittent induced currents of equal strength flowing in two coils connected by a wire is disturbed by the presence of metal within one of the coils, and the fact of this disturbance is made evident by a telephone. The balance may be restored and the telephone silenced by several means, the simplest of which is the introduction into the opposing coil of an identical mass of metal, and, as Prof. Hughes pointed out, this affords a ready means for detecting a counterfeit, since it would not neutralise the disturbance produced in the current by a genuine coin of equal dimensions.

Substances that differ considerably in their induction-balance effect can be very conveniently balanced by means of the tapered and graduated strip of zinc, proposed by Prof. Hughes,¶ laid on the opposing pair of coils; but, as will be seen from the annexed table of results obtained on equal and similar volumes of gold-copper alloys, the method is not adapted for examining those which vary but slightly in composition.

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* Proc. Roy. Soc., vol. xxiii. (1875), p. 481, and Ann. de Chim. et de Phys. [5] xiii. (1878), p. 111.

† Phil. Trans., vol. 164 (1874), p. 495.

‡ Proc. Roy. Soc., vol. xxiii. (1875), p. 344.

§ Proc. Roy. Soc., vol. xxix. (1879), p. 56.

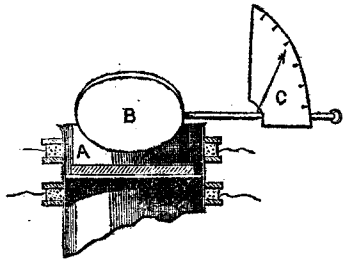
‖ Ibid, and Phil. Mag. [5], vol. viii. (1879), p. 50; and Proc. Phys. Soc., vol. iii. (1879), p. 81.

¶ Phil. Mag. [5], vol. viii. (1879), p. 53.

Standard by Assay.	Readings on Zinc Scale.	Standard by Assay.	Readings on Zinc Scale.
1000·0	200	913·7	66
990·9	188	911·8	66
958·8	78	901·3	65
925·0	70	878·0	64
920·3	69	859·2	62
918·1	67	709·2	60
916·3	66		

But it soon became evident that the instrument is capable of indicating more minute differences of standard, and I at first tried to obtain trustworthy indications by raising or lowering a supplementary horizontal disc by means of a micrometer screw, and this disc was subsequently replaced by an obtuse hollow cone of silver, by which the sensitiveness of the instrument was increased. Prof. Hughes, however, who throughout the experiments has afforded me the most generous aid, suggested the following arrangement which has given the best results yet obtained.

A disc of gold or other metal, A, is placed within one pair of coils, and over it is a metal vane or damper, B, the nature and dimensions of which may be varied to suit particular cases. This vane is turned on its horizontal diameter until the silence of the telephone shows that a balance has been attained, the maximum effect being produced when the vane is horizontal. Its position is read off by means of an index passing over a graduated arc, C.



The annexed table gives the results obtained by this means on a gold-copper series from 901 to 925, which, as has already been shown, is comprised within a range of only six graduations on the zinc scale. Alloys whose composition lies beyond these limiting values could not be examined by the disc and vane employed, but suitable ones can be selected for any given series of limited extent.

Standard by Assay.	Degrees on graduated Arc.	Standard by Assay.	Degrees on graduated Arc.
925·0	74	914·2	44
920·3	65	911·8	42
916·8	53	901·3	28
915·7	51		

It is now known* that the effect of equal and similar volumes of different metals on the induction balance depends mainly on their electrical resistances, as I have elsewhere† proved by direct experiment. It is only necessary to glance at such curves as those representing the induction-balance effect of the gold-silver and gold-copper alloys to be satisfied that, at their two extremities, this effect is greatly influenced by very minute differences of composition.

Unfortunately the gold-copper alloys used for coinage are situated below these sensitive portions of the curve, a fact which adds materially to the difficulty of employing the instrument in verifying the standard of coins. It should further be pointed out that the establishment of a method of verifying the composition of alloys of the precious metals must in part depend on the degree to which the presence of traces of foreign metals influences the accuracy of the results. As might have been anticipated, the molecular state of an alloy appears, under certain conditions, to affect the induction balance more than small differences of composition. Thus annealing certain alloys of silver produces changes in their induction-balance effect that are equivalent to considerable variations of standard, and it will therefore be necessary to ascertain whether some simple method can be found for bringing any given series of alloys under identical molecular conditions.

The possibility of ascertaining the standard fineness of alloys by the aid of electricity long ago occupied the attention of physicists. In 1823 M. Becquerel‡ suggested that trustworthy indications might be afforded by the electromotive force developed when the alloy is placed in an exciting fluid together with an alloy of known composition. The subject was partially investigated by Oersted in 1828,§ and, as its practical importance was further indicated by Gay-Lussac in 1830,‖ I made a series of experiments¶ in order to ascertain how far the more delicate appliances in use at the present day could be made serviceable. The results, however, were not entirely satisfactory.

Prof. Hughes's instrument rendered it possible to resume the research on a new basis, and the results given above afford another instance of the growing importance of physical research in connexion with metallurgical problems.

There is but little probability of finding a more accurate method of assaying than that now in use, but, on the other hand, it would be of such great advantage to possess a method which would enable the standard of coins to be verified without destroying their integrity that the capabilities of the induction balance demand careful investigation.

The instrument has already yielded scientific results of importance, as by its aid I have been able to show** that in the case of the copper-tin alloys the curve of the conductivity for heat corresponds closely with that representing the induction-balance effect. At the same time I pointed to the incomplete character of Matthiessen's curve of electric conductivity, and confirmed the remarkable observation of L. De la Rive††

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* Poynting. Phil. Mag. [5], vol. ix., p. 59; and Proc. Phys. Soc., vol. iii. (1879), p. 169; Lodge. Phil. Mag. [5], vol. ix., p. 123; and Proc. Phys. Soc., vol. iii., p. 187.

† Phil. Mag. [5], vol. viii., p. 57; and Proc. Phys. Soc., vol. iii., p. 89.

‡ Ann. de Chim. et de Phys., vol. xxiv. (1823), p. 343.

§ Ibid, vol. xxxix. (1828), p. 274.

‖ Instruction sur l'Essai des Matières d'Argent par la voie Humide. Paris, 1830.

¶ Eighth Annual Report (1877), p. 45.

** Phil. Mag. [5], vol. viii. (1879), p. 551; and Proc. Phys. Soc., vol. iii., p. 156.

†† Comptes Rendus, vol. lvii (1863), p. 698.

that the conductivity of bismuth is less in the solid than in the molten state.

In conducting these varied researches I have had the advantage of the assistance of Mr. Edward Rigg, M.A., one of the Assistant Assayers, whose skill and energy have abundantly justified the high opinion formed of his work in the Physical Laboratory at Oxford, where he obtained a high scientific degree.

I have ventured to set forth these facts at some length, because at the time the appointment of Chemist was created it was uncertain what the nature of the duties of the office would be. I may now express the hope that the arrangements which their Lordships were pleased to make in 1870 for providing for the scientific wants of the Mint may be considered to have been advantageous to the Department.

W. Chandler Roberts,
17th March 1880. Chemist of the Mint.

No. III.

General Account of Expenses and Receipts.

Abstract Statement, showing the payments in the Year ended 31st December 1879, for the Salaries and Expenses of the Royal Mint; the amounts of Profit or Loss resulting in the Year on account of the Silver and Bronze Coinage (as per Accounts appended); and the amount realised by the sale of Sweepings from the Gold Coinage, and other miscellaneous receipts of the Mint payable to the Exchequer.

	£	s.	d.	£	s.	d.
Payments in the year for salaries and expenses, viz.:						
Salaries, allowances, and wages	16,805	1	6			
Police	778	8	4			
Incidental office expenses	137	18	3			
Machinery and repairs	1,585	5	2			
Incidental coinage expenses	3,497	19	3			
Brokerage	125	8	4			
Supply of silver and bronze coin to Colonies	3,527	11	3			
				26,457	7	1
Superannuation and compensation allowances				4,482	18	9
Amount of expenditure incurred in the year by other Departments on account of the Mint, viz.:						
By the Office of Works, for repair of buildings, parochial rates, fuel, gas, &c.	4,762	11	3			
By the Stationery Office for stationery, &c.	190	0	0			
				4,952	11	3
				35,892	17	1
Cost of alloy metal for gold coinage				Nil.		
Loss on gold coinage (waste, partially recoverable in the sweepings)				Nil.		
Loss on worn silver coin exchanged				51,139	18	8
Do. exchanged at the Melbourne Mint (as per Account, p. 51)				3,562	0	5
Do. exchanged at the Sydney Mint				345	17	10
				90,940	14	0

	£	s.	d.	£	s.	d.
Profit on silver bullion purchased in the year for coinage (as per Account, page 51)				25,547	16	8
Profit on bronze coinage (as per Account, page 52)				35,396	5	2
Amount received for Sweepings from the Gold Coinage				Nil.		
Miscellaneous receipts, viz.:						
For dies supplied for the Sydney and Melbourne Mints	148	2	6			
For striking medals, making assays, and other Mint charges on account of the Indian and Colonial Governments	885	19	0			
For rent of Refinery, and other miscellaneous receipts	1,007	0	7			
				2,041	2	1
Excess of expenses over receipts in the year ended 31st December 1879				27,955	10	1
				90,940	14	0

Royal Mint,
8th March 1880.

C. W. Fremantle,
Deputy Master of the Mint.

No. IV.

SILVER COINAGE ACCOUNT.

ACCOUNT of the payments made in the Year ended 31st December 1879, for the purchase of Silver Bullion and for worn Silver Coin exchanged; the amount received for Silver Coin sold; and the value of Silver Coin and Bullion in store at the commencement and close of the Year; showing the amount of Profit realised on the Silver Bullion purchased for Coinage, and the Loss resulting from the exchange of worn Silver Coin, in the Year.

	Silver Bullion.	Worn Silver Coin.
	£ s. d.	£ s. d.
Mint value of silver coin and bullion in store at the commencement of the year:		
£ s. d.		
Coin - - 131,711 5 9		
Bullion - - 149,076 10 5		
	280,787 16 2	
Amount paid in the year for silver bullion purchased - - - -	104,772 14 7	
Mint value of worn silver coin melted into bullion (transferred as per contra)	440,352 17 8	
Amount paid for metal (for alloy) -	Nil.	
Value of copper (for alloy) transferred from Copper Coinage Account -	Nil.	
Amount paid in exchange for worn silver coin at the nominal value (1,601,283·212 oz.) - - - -	- - -	495,054 16 9
Profit on silver bullion purchased for coinage - - - -	25,547 16 8	
	851,461 5 1	495,054 16 9

	Silver Bullion.	Worn Silver Coin.
	£ s. d.	£ s. d.
Amount received in the year for silver coin sold at its nominal value - -	619,179 18 11	
Amount received for sweepings - -	132 14 10	
Mint value of silver coin melted into bullion (1,601,283·212 oz. at 5s. 6d. per oz.) transferred to silver bullion account as per contra - - - -	- - -	440,352 17 8
Mint value of silver coin and bullion in store at the end of the year:—		
£ s. d.		
New coin at its nominal value - - 61,891 6 0		
Bullion at the Mint value of 5s. 6d. per ounce - - 170,257 5 4		
	232,148 11 4	
Loss on worn silver coin exchanged -	- - -	54,701 19 1
£	851,461 5 1	495,054 16 9

	£ s. d.	£ s. d.
Seignorage on bullion purchased - -	26,073 10 7	
Amount received for sweepings - -	132 14 10	
		26,206 5 5
Deduct:		
Waste (partially recoverable in sweepings) -	658 8 9	
Amount paid for alloy metal - -	Nil.	
		658 8 9
Profit, as above, on silver bullion purchased - -		25,547 16 8

Royal Mint,
8th March 1880.

C. W. FREMANTLE,
Deputy Master of the Mint.

No. V.

COPPER (BRONZE) COINAGE ACCOUNT.

ACCOUNT of the payments made in the Year ended 31st December 1879, for the purchase of Copper and other Metal for Bronze Coinage, the amount received for Bronze Coin and old Copper sold; and the value of Bronze Coin and Metal in store at the commencement and close of the Year; showing the amount of Profit or Loss which has resulted in the Year.

	£	s.	d.	£	s.	d.
Value of bronze coin and metal in store at the commencement of the year :—						
Bronze coin (at its nominal value)	4,671	10	6			
*Bronze bars (at the Mint value)	24,153	7	0			
Old copper coin (at the market value of the metal)	1,211	18	3			
Tin (do.)	36	0	5			
Zinc (do.)	11	9	1			
				30,084	5	3
Amount paid in the year for bronze metal	6,937	10	0			
For copper	506	19	9			
For tin	—					
For zinc	—					
				7,444	9	9
Balance, viz.:						
Profit on bronze coinage	35,396	5	2			
Amount realised by the sale, &c., of surplus metal (old copper coin)	Nil					
				35,396	5	2
				£72,925	0	2

	£	s.	d.	£	s.	d.
Amount received in the year for bronze coin sold at its nominal value				38,970	0	0
Amount received for sweepings				Nil		
Value of old copper coin transferred to Silver Coinage Account (for alloy)				Nil		
Value of bronze coin and metal in store at the end of the year :—						
Bronze coin (at its nominal value)	10,443	10	9			
*Bronze bars (at the Mint value)	22,098	4	7			
Old copper coin (at the market value of the metal)	1,365	16	2			
Tin (do.)	33	8	10			
Zinc (do.)	13	19	10			
				33,955	0	2
				£72,925	0	2

* The value of bronze bars is calculated on the assumption that a proportion will be coined into pence and the remainder into halfpence and farthings.

Royal Mint,
8th March 1880

C. W. FREMANTLE,
Deputy Master of the Mint.

No. VI.

Consolidated Fund Advances and Repayments.

An Account of the sums advanced in each Year from the Consolidated Fund for the purchase of Bullion for Coinage; and of the sums paid in each Year to the account of Her Majesty's Exchequer at the Bank of England in repayment thereof.

Date.	Amounts Advanced from the Consolidated Fund.			Amounts paid into the Exchequer in Repayment of Advances.			Remarks.
	£ s. d.	£ s. d.		£	£ s. d.		
1837	- - -	22,000 0 0		- - -	- - -		As given in detail in previous Returns
1838	- - -	196,029 19 4		- - -	168,029 19 4		
1839	- - -	400,000 0 0		- - -	350,000 0 0		
1840	- - -	170,000 0 0		- - -	175,000 0 0		
1841	- - -	100,000 0 0		- - -	135,000 0 0		
1842	- - -	180,000 0 0		- - -	162,120 4 0		
1843	- - -	350,000 0 0		- - -	265,000 0 0		
1844	- - -	550,000 0 0		- - -	501,389 17 9		
1845	- - -	850,000 0 0		- - -	678,772 2 9		
1846	- - -	360,000 0 0		- - -	429,937 1 11		
1847	- - -	100,000 0 0		- - -	217,033 10 2		
1848	- - -	- - -		- - -	18,534 3 1		
1849	- - -	150,000 0 0		- - -	120,000 0 0		
1850	- - -	150,000 0 0		- - -	120,000 0 0		
1851	- - -	100,000 0 0		- - -	137,213 1 1		
1852	- - -	391,970 0 8		- - -	191,970 0 8		
1853	- - -	508,029 19 4		- - -	550,000 0 0		
1854	- - -	100,000 0 0		- - -	200,000 0 0		
1855	- - -	250,000 0 0		- - -	300,000 0 0		
1856	- - -	450,000 0 0		- - -	450,000 0 0		
1857	- - -	420,000 0 0		- - -	350,000 0 0		
1858	- - -	400,000 0 0		- - -	400,000 0 0		
1859	- - -	550,000 0 0		- - -	650,000 0 0		
1860	- - -	270,000 0 0		- - -	150,000 0 0		
1861	- - -	400,000 0 0		- - -	550,000 0 0		
1862	- - -	400,000 0 0		- - -	350,000 0 0		
1863	- - -	250,000 0 0		- - -	250,000 0 0		
1864	- - -	600,000 0 0		- - -	630,000 0 0		
1865	- - -	520,000 0 0		- - -	460,000 0 0		
1866	- - -	410,000 0 0		- - -	510,000 0 0		
1867	- - -	300,000 0 0		- - -	250,000 0 0		
1868	- - -	220,000 0 0		- - -	200,000 0 0		
1869	- - -	250,000 0 0		- - -	130,000 0 0		
1870	- - -	235,000 0 0		- - -	350,000 0 0		
1871	- - -	820,000 0 0		- - -	600,000 0 0		
1872	- - -	1,750,000 0 0		- - -	1,250,000 0 0		
1873	- - -	650,000 0 0		- - -	950,000 0 0		
1874	- - -	650,000 0 0		- - -	763,029 19 4		
1875	- - -	500,000 0 0		- - -	650,000 0 0		
1876	- - -	325,000 0 0		- - -	250,000 0 0		
1877	- - -	500,000 0 0		- - -	440,000 0 0		
1878	- - -	505,000 0 0		- - -	605,000 0 0		
1879	Jan. 11 35,000 0 0			Jan. 11 50,000			
	„ 24 40,000 0 0			Mar. 29 25,000			
	Feb. 6 20,000 0 0			May 23 25,000			
	Mar. 21 25,000 0 0			July 8 40,000			
	Apr. 25 100,000 0 0			„ 26 30,000			
	May 10 40,000 0 0			Sep. 26 60,000			
	July 8 40,000 0 0	625,000 0 0		Oct. 9 25,000	475,000 0 0		
	„ 19 75,000 0 0			Nov. 11 25,000			
	Sep. 26 45,000 0 0			„ 28 50,000			
	Oct. 11 50,000 0 0			Dec. 10 110,000			
	Nov. 13 25,000 0 0			„ 24 35,000			
	Dec. 9 100,000 0 0						
	„ 24 30,000 0 0			Balance due to the Exchequer on 31 Dec. 1879 - - -	435,000 0 0		
	£	16,868,029 19 4		£	16,868,029 19 4		

Royal Mint,
8th March 1880.

C. W. Fremantle,
Deputy Master of the Mint.

No. VII.

Moneys coined, &c. in the last Ten Years.

* Statement of all Gold, Silver, and Copper (Bronze) Moneys of the Realm, coined, and of worn Silver Coin exchanged, &c., from the 1st day of January 1870 to the 31st day of December 1879.

GOLD COINAGE.

Date.	Sovereigns.			Half Sovereigns.			Total Value.
	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.	
	oz.		£ s. d.	oz.		£ s. d.	£ s. d.
1870	468,104·162	1,822,680	1,822,680 11 7	126,021·298	981,408	490,695 8 7	2,313,376 0 2
1871	2,262,799·401	8,810,775	8,810,775 3 4	284,784·820	2,217,760	1,108,880 17 10	9,919,656 1 2
1872	3,504,047·648	13,643,880	13,643,885 10 7	415,423·760	3,235,112	1,617,556 5 3	15,261,441 15 10
1873	611,964·096	2,382,832	2,382,835 4 0	257,267·094	2,003,464	1,001,733 14 11	3,384,568 18 11
1874	133,452·050	519,628	519,628 18 4	241,909·844	1,883,872	941,936 9 1	1,461,565 7 5
1875	—	—	—	62,475·514	486,494	243,264 0 8	243,264 0 8
1876	846,152·264	3,294,700	3,294,705 7 6	360,049·696	2,804,000	1,401,943 10 1	4,696,648 17 7
1877	—	—	—	252,062·638	1,962,800	981,468 17 11	981,468 17 11
1878	284,119·162	1,106,361	1,106,288 19 9	297,600·028	2,317,506	1,158,780 2 2	2,265,069 1 11
1879	4,500·724	17,525	17,524 13 10	4,500·922	35,050	17,525 9 3	35,050 3 1
	8,115,139·507	31,598,381	31,598,324 8 11	2,302,095·614	17,927,466	8,963,784 15 9	40,562,109 4 8

SILVER COINAGE.

Date.	Half Crowns.			Florins.			Shillings.		
	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.
	oz.		£	oz.		£	oz.		£
1870	—	—	—	718,560·000	1,976,040	197,604	347,040·000	1,908,720	95,436
1871	—	—	—	1,293,840·000	3,558,960	355,806	876,240·000	4,819,320	240,966
1872	—	—	—	2,516,400·000	6,920,100	692,010	1,612,080·000	8,866,440	443,322
1873	—	—	—	2,169,360·000	5,965,740	596,574	1,179,360·000	6,486,480	324,324
1874	993,600·000	2,185,920	273,240	657,360·000	1,807,740	180,774	1,000,080·000	5,500,440	275,022
1875	505,440·000	1,111,968	138,996	415,440·000	1,142,460	114,246	792,000·000	4,356,000	217,800
1876	288,000·000	633,600	79,200	221,040·000	607,860	60,786	139,680·000	768,240	38,412
1877	203,040·000	446,688	55,836	249,840·000	687,060	68,706	594,000·000	3,267,000	163,350
1878	666,000·000	1,465,200	183,150	649,440·000	1,785,960	178,596	568,080·000	3,124,440	156,222
1879	409,680·000	901,296	112,662	492,480·000	1,354,320	135,432	656,640·000	3,611,520	180,576
	3,065,760·000	6,744,672	843,084	9,383,760·000	25,805,340	2,580,534	7,765,200·000	42,708,600	2,135,430

* The amounts for 1879 shown in this Return differ from those given on page 4, as the latter give the number of good pieces actually coined, while the former show the amount of coin delivered to the public, or into store at the Mint Office, during the year.

SILVER COINAGE—*cont.*

Date.	Sixpences.			Fourpences.			Threepences.		
	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.
	oz.		£	oz.		£ s. d.	oz.		£ s. d.
1870	95,040·000	1,045,440	26,136	252·000	4,158	69 6 0	63,564·000	1,398,408	17,480 2 0
1871	333,360·000	3,666,960	91,674	252·000	4,158	69 6 0	47,004·000	1,034,088	12,926 2 0
1872	343,440·000	3,777,840	94,446	252·000	4,158	69 6 0	50,604·000	1,113,288	13,916 2 0
1873	399,600·000	4,395,600	109,890	252·000	4,158	69 6 0	184,524·000	4,059,528	50,744 2 0
1874	384,480·000	4,229,280	105,732	252·000	4,158	69 6 0	202,524·000	4,455,528	55,694 2 0
1875	295,920·000	3,255,120	81,378	252·000	4,158	69 6 0	150,684·000	3,315,048	41,438 2 0
1876	76,320·000	839,520	20,988	252·000	4,158	69 6 0	83,004·000	1,826,088	22,826 2 0
1877	370,080·000	4,070,880	101,772	252·000	4,158	69 6 0	113,244·000	2,491,368	31,142 2 0
1878	238,320·000	2,621,520	65,538	252·000	4,158	69 6 0	110,364·000	2,428,008	30,350 2 0
1879	302,400·000	3,326,400	83,160	252·000	4,158	69 6 0	134,844·000	2,966,568	37,082 2 0
	2,838,960·000	31,228,560	780,714	2,520·000	41,580	693 0 0	1,140,360·000	25,087,920	313,599 0 0

SILVER COINAGE—*cont.*

Date.	Twopences.			Pence.			Total Value of Silver Coined.	Total Amount Paid for Silver Bullion.
	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.		
	oz.		£ s. d.	oz.		£ s. d.	£ s. d.	£ s. d.
1870	144·000	4,752	39 12 0	120·000	7,920	33 0 0	336,798 0 0	100,433 5 3
1871	144·000	4,752	39 12 0	120·000	7,920	33 0 0	701,514 0 0	720,821 5 9
1872	144·000	4,752	39 12 0	120·000	7,920	33 0 0	1,243,836 0 0	1,544,848 14 8
1873	144·000	4,752	39 12 0	120·000	7,920	33 0 0	1,081,674 0 0	522,957 0 2
1874	144·000	4,752	39 12 0	120·000	7,920	33 0 0	890,604 0 0	421,928 7 9
1875	144·000	4,752	39 12 0	120·000	7,920	33 0 0	594,000 0 0	388,744 17 3
1876	144·000	4,752	39 12 0	120·000	7,920	33 0 0	222,354 0 0	—
1877	144·000	4,752	39 12 0	120·000	7,920	33 0 0	420,948 0 0	310,290 8 9
1878	144·000	4,752	39 12 0	120·000	7,920	33 0 0	613,998 0 0	100,132 2 8
1879	144·000	4,752	39 12 0	120·000	7,920	33 0 0	549,054 0 0	104,772 14 7
	1,440·000	47,520	396 0 0	1,200·000	79,200	330 0 0	6,654,780 0 0	4,214,978 16 10

BRONZE COINAGE.

Date.	Pence.			Halfpence.			Farthings.			Total Value of Bronze Coined.	Total Amount Paid for Bronze Bullion and Old Copper Metal.
	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.	Weight.	Number of Pieces.	Value.		
	Tons.		£	Tons.		£ s. d.	Tons.		£ s. d.	£ s. d.	£ s. d.
1870	53	5,698,560	23,744	24	4,300,800	8,960 0 0	- -	- -	- -	32,704 0 0	6,726 11 6
1871	12	1,290,240	5,376	6	1,075,200	2,240 0 0	- -	- -	- -	7,616 0 0	1,196 15 0
1872	80	8,601,600	35,840	25	4,480,000	9,333 6 8	6	2,150,400	2,240 0 0	47,413 6 8	898 17 6
1873	79	8,494,080	35,392	20	3,584,000	7,466 13 4	9	3,225,600	3,360 0 0	46,218 13 4	13,618 9 6
1874	109	11,719,680	48,832	35	6,272,000	13,066 13 4	10	3,584,000	3,733 6 8	65,632 0 0	30,997 8 10
1875	110	11,827,200	49,280	36	6,451,200	13,440 0 0	19	6,809,600	7,093 6 8	69,813 6 8	24,000 2 7
1876	103	11,074,560	46,144	38	6,809,600	14,186 13 4	3	1,075,200	1,120 0 0	61,450 13 4	14,663 14 10
1877	90	9,676,800	40,320	29	5,196,800	10,826 13 4	- -	- -	- -	51,146 13 4	9,392 7 9
1878	23	2,472,960	10,304	8	1,433,600	2,986 13 4	10	3,584,000	3,733 6 8	17,024 0 0	1,162 3 7
1879	73	7,848,960	32,704	20	3,584,000	7,466 13 4	12	4,300,800	4,480 0 0	44,650 13 4	7,444 9 9
	732	78,704,640	327,936	241	43,187,200	89,973 6 8	69	24,729,600	25,760 0 0	443,669 6 8	110,101 0 10

Worn Silver Coin purchased for Exchange.

Date.	Weight.	Nominal Value.	Mint Value at 5s. 6d. per oz.	Loss by Exchange.
	oz.	£ s. d.	£ s. d.	£ s. d.
1870	356,023·295	115,000 0 0	97,906 8 0	17,093 12 0
1871	326,107·111	105,000 0 0	89,679 9 1	15,320 10 11
1872	347,584·522	119,686 14 0	95,585 14 11	15,100 19 1
1873	594,222·521	188,263 6 0	163,411 3 11	24,852 2 1
1874	496,416·000	156,355 0 0	136,514 8 0	19,840 12 0
1875	488,252·973	154,000 0 0	134,269 11 3	19,730 8 9
1876	883,649·416	276,000 0 0	243,001 2 3	32,998 17 9
1877	660,016·212	207,280 0 0	181,504 9 0	25,775 11 0
1878	1,289,189·010	401,635 0 0	354,526 19 6	47,108 0 6
1879	1,601,283·212	495,054 16 9	440,352 17 8	54,701 19 1
	7,042,735·266	2,209,274 16 9	1,936,752 3 7	272,522 13 2

The yearly Average Price paid per ounce for Silver Bullion purchased in the market for coinage in the Years 1870 to 1879, both inclusive, was as follows:—

1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
d.	d.	d.	d.	d.	d.		d.	d.	d.
$60\frac{1}{2}$	$60\frac{7}{16}$	$60\frac{5}{16}$	$58\frac{13}{16}$	$58\frac{1}{4}$	$56\frac{3}{4}$	Nil	$56\frac{1}{16}$	$50\frac{1}{16}$	$52\frac{1}{4}$

The Amount of Seignorage on the Silver Coinage paid into the Exchequer in the Years 1870 to 1879 has been—

1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	*1879.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
9,027 17 9	55,067 19 4	77,391 12 10	85,680 10 2	101,120 0 0	20,306 10 4	52,286 2 0	51,439 2 11	22,268 15 6	32,208 19

* This sum represents the amount of Seignorage on the Silver Coinage actually paid into the Exchequer during the year 1879, whereas the figures given at page 51 represent the amount which accrued during the year on the purchase of bullion.

Royal Mint,
8th March 1880.

C. W. Fremantle,
Deputy Master of the Mint.

No. VIII.

Issue of Bronze Coin to 31st December 1879.

Bronze Coin issued during the Year 1879. (Nominal Value.)				Total Issue of Bronze Coin from 17 December 1860 to 31 December 1879. (Nominal Value.)				Amount of Bronze Coin in Store at the Mint, prepared for issue, on 31 December 1879. (Nominal Value.)			
Pence.	Half-pence.	Far-things.	Total.	Pence.	Half-pence.	Far-things.	Total.	Pence.	Half-pence.	Far-things.	Total.
£	£	£	£	£	£	£	£	£ s. d.	£ s. d.	£ s. d.	£ s. d.
28,050	7,735	3,185	38,970	951,915	416,782	77,441	1,446,138	7,560 18 10	1,509 5 5	1,373 6 6	10,443 10 9

Royal Mint,
8th March 1880.

C. W. Fremantle,
Deputy Master of the Mint.

No. IX.

VERDICT of the JURY of the Goldsmiths' Company at the Trial of the Pyx held on the 2nd of July 1879.

WE, whose names are hereunder written, having been sworn this 2nd day of July 1879, before the Queen's Remembrancer, at Goldsmiths' Hall, in the City of London, have made the assays and trials of Her Majesty's silver coins in the Pyx of the Mint, and which, according to accounts produced by the Officers of the Mint, were coined in the said Mint from the 1st day of July 1878 to the 30th day of June 1879, both days inclusive. We ascertained that the number of coins of silver, in each packet produced to us, corresponded with the number which the Officers of the Mint represented it to contain, and we took a coin or coins from each of such packets of silver coins, making altogether 6 half-crowns, 9 florins, 23 shillings, 16 sixpences, and 12 threepences, and weighed each of the said silver coins separately, so as to ascertain whether they were within the remedy of the First Schedule of the Coinage Act, 1870. We found that the amount of variation from the standard of weight specified in the said First Schedule of the said Act was plus two thousandths of an ounce (or ·002) on the whole of such coins, and that, therefore, they were within the prescribed remedy as to weight. We then melted the said silver coins, so taken out and weighed, into an ingot, and assayed such ingot, comparing it with the standard Silver Trial Plate produced by the Board of Trade, so as to ascertain whether the metal was within the remedy as to fineness prescribed in the said First Schedule to the said Act, and we found that the amount of variation from the standard of fineness specified in the said First Schedule to the said Act, was minus nine ten thousandths (or ·0009) and, therefore, that the said metal was within the prescribed remedy as to fineness. We weighed the residue of the said silver coins in bulk, and we ascertained that they were within the remedy as to weight. We then took from such residue one half-crown, one florin, one shilling, one sixpence, and one three-penny piece, and weighed and assayed them separately, and we found that such half-crown weighed 217·831 grains, that such florin weighed 174·525 grains, that such shilling weighed 87·272 grains, that such sixpence weighed 43·616 grains, and that such three-penny piece weighed 21·808 grains. We then assayed the said half-crown, the said florin, the said shilling, the said sixpence, and the said three-penny piece separately, and we found the millesimal fineness of such half-crown to be 925·3, of such florin to be 924·3, of such shilling to be 925·2, of such sixpence to be 924·6, and of such three-penny piece to be 925·5.

(Signed) G. SMITH HAYTER. FRANCIS B. THOMAS.
JOHN GRAY. STEPHEN SMITH.
H. S. THORNTON. GEORGE LAMBERT.
G. MATTHEY. WM. ROBINSON.
STEWART PIXLEY. HENRY PIZEY.

W. F. POLLOCK,
Queen's Remembrancer.

No. X.

Report of the Deputy Master of the Sydney Branch of the Royal Mint for the year 1879.

Sir, Royal Mint, Sydney, 16th February 1880.

I have the honour to submit, for the consideration of the Master of the Mint, my Report on the Sydney Branch for 1879.

The receipts of gold for coinage slightly exceeded those of the previous year, and amounted to 394,606 ounces. This increase of nearly 30,000 ounces was due to large importations from the neighbouring Colonies, the produce of the gold fields of New South Wales in 1878 and 1879 being about equal.

In addition to the gold above alluded to, 19,275 ounces of auriferous silver from the mines at Boorook in the northern portion of the Colony were also received for treatment.

The issues of gold amounted to 1,413,000*l.* in coin, and 4,588*l.* in bullion, together 1,417,588*l.* The total issued in 1878 was 1,328,276*l.*

The issues of silver bullion were 56,000 ounces, of which, 51,000 were exported, and the remainder kept in the Colony for purposes of manufacture.

New silver and bronze coin amounting respectively to 53,300*l.* and 910*l.* have been sold in accordance with the regulations approved by his Excellency the Governor, and worn silver coin of the nominal value of 9,320*l.* has been withdrawn from circulation in New South Wales.

Owing to the comparatively small receipts of gold for coinage, the Mint revenue was only 9,370*l.* The reduction on the amount for the previous year being due in a great measure to the fact that a considerable quantity of gold was held over during the earlier part of the year, pending the passing of the Gold Duty Abolition Bill, and sent in for coinage after the 1st October under reduced rates.

In the Melting Department, in addition to the preliminary treatment of the whole of the gold and silver, 369,175 ounces of fine gold and alloy, and 496,259 ounces of scissel, were melted into bars for coinage, the average assay of the former being 916·69 and of the latter 916·72. The highest and lowest assay reports for the year were respectively 917·20 and 916·25 for ingot bars, and 917·17 and 916·40 for scissel.

In the Refinery 369,363 ounces of gold and silver bullion were submitted to the chlorine process, and produced 302,447 ounces of refined gold and 56,340 ounces of silver. The average assay of the gold was 996·6 and that of the silver 949·0.

The work in the Assay Department has included the following:—

Rough gold assays - - -	3,009
Refined „ „ - - -	600
Standard „ „ - - -	2,548
Parting assays - - -	2,930
Silver (wet process) - -	236

or a total of 9,323 assays in each of the two Offices, besides 60 mineral analyses. Twenty samples of auriferous quartz, weighing altogether over 26 tons, have also been crushed, and 144 ounces of gold extracted therefrom by amalgamation.

Gold bars weighing 859,769 ounces were passed into the Coining Department, and 1,367,388 sovereigns and 95,000 half-sovereigns struck, weighing together 363,372 ounces. The consumption of dies during the year was at the rate of one pair for every 15,500 pieces coined.

The average weight of the sovereigns was 123·273 grains, and of the half-sovereigns 61·641 grains. The maximum and minimum weight of the pieces selected for assay during the year were 123·41 grains and 123·08 grains for sovereigns, and 61·72 grains and 61·57 grains for half-sovereigns. The average assay of the coin was 916·66, the highest report 917·10, and the lowest 916·25.

A new contrivance for working the collar, designed by Mr. Newton, Foreman of Machinery, has been fixed to one of the coining presses. The arrangement has been in use some months, and has proved a very great success. The springs formerly used for bringing up the collar have been discarded, and their action superseded by that of a weight at the end of the depressing lever. The motion of the collar has thus been made steady and uniform, and quite independent of the lower die.

Three new machines have been added to the plant; a self-acting cutting-out press for trial blanks, a lapping machine for cylinders, and a small lathe for the workshops. These have all been supplied by Messrs. Taylor and Challen of Birmingham, to whom great credit is due for the excellence of their workmanship. The lapping machine is of a new model, and specially designed for the Mint by Messrs. Taylor & Co. It is a most complete little machine, and admirably adapted for the work required.

Emery grinders from Messrs. Thomson, Sterne, & Co. of Glasgow have been used with considerable success for grinding rolls and cylinders, setting dies, and general finishing work.

There were issued during the year 395 orders of admission, and 1,483 visitors were admitted to view the Works.

Mr. French, late Deputy Master's Clerk and Registrar, having resigned his appointment, the Lords Commissioners of Her Majesty's Treasury were pleased to approve of the abolition of the office, and of the promotion of Messrs. Gardner and Colley from the 1st February, with increase of pay, the former to the office of "Registrar and Accountant" and the latter to that of "Bullion Clerk."

Mr. Fletcher, on completing his term of probation, was appointed a Junior Clerk from the 1st January.

Mr. du Moulin, one of the Junior Clerks resigned at the end of the year, and steps are now being taken to fill the vacancy in accordance with the Treasury regulations.

The export duty on gold originally imposed in 1857, and reduced in 1862, was finally abolished by Act of Parliament (43 Vict. No. 5) on the 1st October last, when also new Regulations for the receipt and coinage of gold came into operation.

The total expenditure on account of the establishment was 12,388*l.*, which is more than the amount spent in 1878, but less than the average for previous years. The sum estimated to be required for the current year is 12,480*l.*

The usual statement of receipts and issues, and copies of the new Regulations, are annexed.

I have, &c.

ROBERT HUNT,
Deputy Master.

The Deputy Master,
Royal Mint, London.

Royal Mint, Sydney Branch.

Return of the Weight and Value of Gold received for Coinage; of the Value of Gold Coin and Gold Bullion Issued; and of the Revenue derived from Mint Charges, &c., from the opening of the Mint on the 14th May 1855 to the 31st December 1879.

Year.	Gold received for Coinage.		Gold Coin and Gold Bullion Issued.					Revenue.				
			Gold Coin.			Gold Bullion.	Total.	From Mint Charges.		From Silver.	From other Sources.	Total.
	Gross Weight.	Value of the Gold at £3 17s. 10½d. per oz. standard.	Sovereigns.	Half-sovereigns.	Total.			On New South Wales Gold.	On Foreign Gold.			
	ozs.	£ s. d.	£	£	£	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1855 } 1869 }	7,166,201·86	28,049,050 8 2	24,697,500	1,629,500	26,327,000	1,687,544 5 6	28,014,544 5 6	191,972 7 9	72,287 6 8	4,134 5 11	28,822 6 4	297,216 6 8
1870	317,527·96	1,218,730 4 8	1,220,000	—	1,220,000	23,298 1 9	1,243,298 1 9	4,607 8 11	2,718 17 6	2,911 3 9	1,322 3 4	11,559 13 6
1871	778,627·29	2,887,601 16 5	2,814,000	—	2,814,000	56,418 13 1	2,870,418 13 1	7,316 18 3	7,053 8 5	2,399 16 8	2,117 11 5	18,887 14 9
1872	558,342·45	2,063,774 12 10	1,815,000	178,000	1,993,000	98,728 2 1	2,091,728 2 1	9,539 19 5	3,276 17 4	2,093 6 7	2,879 1 3	17,789 4 7
1873	436,624·91	1,611,940 17 1	1,478,000	—	1,478,000	50,963 1 5	1,528,963 1 5	7,234 10 10	2,489 3 6	996 9 5	1,666 15 0	12,386 18 9
1874	551,046·65	2,073,666 19 11	1,899,000	126,000	2,025,000	11,611 12 8	2,036,611 12 8	6,725 6 9	4,538 8 8	1,096 13 11	1,753 18 10	14,114 8 2
1875	547,484·63	2,061,070 16 5	2,122,000	—	2,122,000	6,517 6 0	2,128,517 6 0	5,714 15 10	4,297 14 8	2,111 5 6	1,441 15 11	13,565 11 11
1876	431,905·27	1,605,557 19 8	1,613,000	30,000	1,643,000	8,292 17 4	1,651,292 17 4	3,941 8 10	3,687 10 5	1,179 10 10	1,687 14 1	10,496 4 2
1877	438,385·50	1,603,248 2 8	1,590,000	—	1,590,000	6,656 18 7	1,596,656 18 7	3,316 9 11	3,691 11 8	2,612 3 4	1,282 14 9	10,902 19 8
1878	365,173·89	1,308,898 1 5	1,259,000	63,000	1,322,000	6,276 5 8	1,328,276 5 8	2,944 3 9	2,888 18 11	2,012 3 2	1,964 14 2	9,810 0 0
1879	394,606·76	1,434,871 3 2	1,366,000	47,000	1,413,000	4,588 8 9	1,417,588 8 9	2,535 12 1	2,961 14 1	2,202 4 1	1,670 0 8	9,369 10 11
Total	11,985,927·22	45,923,411 2 5	41,873,500	2,073,500	43,947,000	1,960,895 12 10	45,907,895 12 10	245,849 2 4	109,891 11 10	23,749 3 2	46,608 15 9	426,098 13 1

Year.	Countries in which the Gold was Produced.									
	New South Wales.	Queensland.	New Zealand.	Victoria.	Tasmania.	South Australia.	New Caledonia.	Other Countries.	Coin.	Total.
	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
1855 } 1869 }	4,263,556·06	327,005·72	1,321,262·34	1,226,076·37	2,187·90	—	—	2,387·05	23,626·42	7,166,201·86
1870	143,709·44	85,337·76	53,090·39	31,603·23	—	—	—	—	3,787·14	317,527·96
1871	242,596·91	143,375·34	237,119·18	148,701·17	1,104·74	—	353·65	—	5,376·30	778,627·29
1872	331,273·19	133,981·05	55,980·16	30,960·64	2,202·79	—	2,425·54	—	1,519·08	558,342·45
1873	259,579·77	151,096·31	23,208·82	—	197·02	—	1,978·22	—	564·77	436,624·91
1874	233,216·59	293,554·16	23,369·27	51·04	—	75·99	443·90	—	335·70	551,046·65
1875	226,985·50	297,441·20	21,984·98	60·08	—	156·19	—	—	856·73	547,484·68
1876	153,531·48	262,177·11	14,245·62	—	—	211·02	429·92	—	1,310·12	431,905·27
1877	121,593·38	310,246·68	1,674·00	132·74	—	822·15	373·95	—	3,542·60	438,385·50
1878	107,347·97	234,722·65	16,008·97	72·34	27·21	464·57	2,338·84	253·69	3,937·65	365,178·89
1879	106,899·88	239,925·33	38,146·49	65·36	1·08	1,443·66	853·78	7·00	7,264·18	394,606·76
Total	6,190,296·17	2,478,863·31	1,806,090·22	1,437,722·97	5,720·74	3,173·58	9,197·80	2,747·74	52,120·69	11,985,927·22

Regulations for the Receipt and Coinage of Gold at the Sydney Branch of the Royal Mint.

His Excelleney the Governor, with the advice of the Executive Council, has been pleased to frame the following Regulations for the receipt and coinage of gold at the Sydney Branch of the Royal Mint,—such Regulations to take effect from the 1st day of October 1879, and to supersede all others previously in force:—

1. Gold for coinage will be received at the Mint daily, between the hours of 11 a.m. and 3 p.m., Saturdays and holidays excepted.

2. Each parcel of gold for which a separate assay is required will be treated as a separate deposit.

3. The value of each deposit will be determined upon the reports of the mint assayers on its assay after melting, and computed on decimal assay reports of gold to the $\frac{1}{2000}$th part, and of silver to the $\frac{1}{100}$th part.

4. The whole of the gold contained in a deposit will be accounted for at the rate of 3*l.* 17*s.* 10½*d.* the ounce, standard, and all silver in excess of two per cent. at the rate of four shillings the ounce, fine.

5. The following will be the charges for melting, assaying, and coining, which will be deducted from the gross value of the deposit as above defined.

A.—On gold raised in New South Wales—

(1.) In deposits of less than five hundred ounces, standard, at the rate of sixpence per ounce, six shillings being charged for a deposit under twelve ounces.

(2.) In deposits of five hundred ounces and over, but less than five thousand ounces, standard, at the rate of four pence per ounce.

(3.) In deposits of five thousand ounces, standard, and over, at the rate of two pence per ounce.

B.—On gold certified to be the produce of any other country—

A reduction of one penny per ounce in the above charges will be made, five shillings being charged for a deposit under twelve ounces.

6. Light gold coin of the realm in parcels of 50*l.* nominal value and upwards, will be received for re-coinage free of charge.

7. Deposits received up to noon on Wednesdays will be payable by the following Tuesday. Deposits received after that time, by the following Tuesday week.

8. Deposits which may be found to be unsuitable for coining will either be returned to the depositor, or be subjected to an extra charge for special treatment.

6. Gold and silver bullion will be prepared for issue when required,—gold at 3*l.* 17*s.* 10½*d.* the ounce, standard, and silver at five shillings the ounce, fine.

(Signed) James Watson.

The Treasury, New South Wales,
Sydney, 26th September 1879.

New Silver Coin.

His Excellency the Lieutenant-Governor has been pleased to approve of the following Regulations for the issue of new silver coin from the Sydney Branch of the Royal Mint.

Regulations.

New British silver coin in quantities not less than 400*l.* will be supplied to the public on the following conditions :—

1. The coin will be issued in bags, each containing the undermentioned quantities,—

	£
Half-crowns	100
Florins	100
Shillings	100
Sixpences	100
Threepences	25

2. Applications, in writing, specifying the quantity and denomination of coin required will be received by the Deputy Master.

3. As soon as the demand can be complied with, notice will be sent to the applicant, who will then be required to pay to the credit of the Mint banking account the sum representing the value of the coin allotted to him.

4. The coin will be deliverable at the Mint, between the hours of 11 and 3, on the Tuesday next after the day of payment at the bank.

(Signed) Robert Hunt,
Deputy Master.

Royal Mint, Sydney,
17th June 1879.

No. XI.

REPORT of the Deputy Master of the Melbourne Branch of the Royal Mint for the year 1879.

SIR, Royal Mint, Melbourne, 16th February 1880.

I HAVE the honour to submit for your consideration my Report on this Branch of the Royal Mint for the year 1879.

The coinage of the year has been 2,740,000*l.*, all in sovereigns, being the largest coinage in any one year since the establishment of this Branch of Her Majesty's Mint, and exceeding that of 1878, in which the largest previous coinage took place, by 569,000*l.*

The gold raised in Victoria in 1879 is estimated at 758,947 ounces, a slight increase on the estimated production in 1878.

The gold received for coinage amounted to 656,555·84 ounces.

The weight of gold refined was 674,159·70 ounces, from which there were recovered 23,680·76 ounces of fine silver.

26,523·63 ounces of fine silver, equal to 28,674·19 ounces standard, were sold during the year to jewellers and others, and 6,112·17 ounces remain in store.

The weight of standard gold bars prepared and passed into work was 1,073,488·09 ounces.

The per-centage of good work, *i.e.* coin obtained from bars, has considerably improved during the past year, and amounted to an average of 65·59 per cent., as against 59·32 per cent. in 1878.

The revenue has been 9,348*l.* 10*s.* 11*d.*, which has been paid into the Colonial Treasury.

The revenue for 1878 was 8,572*l.* 5*s.* 4*d.*

The saving on the Mint Annuity for 1878, viz., 6,349*l.* 12*s.* 7*d.*, has, in accordance with your directions, been paid into the Colonial Treasury. The saving on the Mint Annuity for 1879 has been 5,629*l.* 15*s.* 10*d.* The net cost to the Colony of Victoria of the establishment for 1879 has been 5,021*l.* 13*s.* 3*d.*, against 5,078*l.* 2*s.* 1*d.* in 1878.

The two remittances of silver coin of the nominal value of 50,000*l.* each, received from the Royal Mint in London, have been absorbed in this and the neighbouring Colonies. Coin to the extent of 49,050*l.* nominal value was sold for cash, and 50,950*l.* nominal value exchanged for worn coin.

The silver coin in this Colony has consequently been very much improved, but there is still in circulation a large amount of worn coin which ought to be withdrawn.

I append to this Report statements of the work performed in the Operative Departments during the year 1879, together with the usual annual tabular statements.

I have, &c.

The Right Honourable
The Master of the Mint, London.

V. DELVES BROUGHTON,
Deputy Master.

APPENDIX "A."

COINING DEPARTMENT.

MEMORANDUM of ALTERATIONS of MACHINERY, &c., during the year 1879.

1. *Cutting-out Presses.*—The Department started originally with three cutting-out presses obtained from England, but, this number being found insufficient, two were added of our own manufacture. But even five were found not enough to get through the great increase of work with the necessary expedition, and two more were added during the year, so that now the Department possesses seven of these machines. The

four presses made here are smaller and more compact than those supplied from England, and some improvements have been introduced by slight alterations in details.

2. *Coining-Presses.*—The two coining-presses mentioned in last year's Report as being under alteration have been finished. The improvements are similar to those applied to the two presses altered last year, and detailed in the Annual Report.

3. *Asbestos Coating to Steam Pipe.*—In order to effect a saving in the amount of fuel, and to minimise the waste in steam, a contract was entered into with an American firm, to cover the fronts of the boilers, the steam-pipe, and the cylinders with a coating (made principally from asbestos), for which they held a patent, and which was asserted to be very advantageous. Although not so great a success as was anticipated, it has proved of considerable value.

4. *Medal Press.*—A new bed has been provided for the bolsters used in the medal press, so that those of any size up to 3 inches may be used, and the blanks may be removed from the press as they are cut. Formerly this could not be done, and the consequence was a great waste of time from the filling-up and repeated re-setting of the bolster required.

5. *Dies.*—A great improvement has been found in the dies. Almost the only fault now noticed is that some of them have slight cracks on the face, probably due to some flaw in the steel. These cracks are generally near the edge, and run through the date and letters. They are hardly noticeable (sometimes quite imperceptible) before the die is used, but are found to open and become quite distinct when it is subjected to the coining-press.

6. *Working Results.*—The results of operations in the Department during the year have been very satisfactory. The loss has been much below the average, while the per-centage of out-turn has been much above it. The number of pieces (sovereigns) struck per pair of dies has reached the high average for the year of 46,800.

These results have been obtained although a larger quantity of gold than in any previous year has been operated upon, and a much shorter time than heretofore has been allowed for turning out the coin.

Comparison of Operations of the last three years.

Particulars.	1877.	1878.	1879.
	ounces.	ounces.	ounces.
Bars received for coinage - - -	724,629·77	939,890·52	1,073,488·09
Sovereigns struck from bars -	382,053·28	557,562·58	704,066·56
Half-sovereigns - - - -	10,526·61	—	—
Scissel - - - - -	332,043·66	372,310·74	369,422·70
Loss in coining - - - -	6·22	17·20	1·17*
Proportion of sovereigns turned out on amount operated on (actual).	·5525	·5932	·6539†
Proportion of blanks cut from bars -	·6808	·7085	·7135
Proportion of good blanks from blanks cut.	·8143	·8400	·9183
Proportion of loss on amount operated on.	·000009	·000018	Gain.
Proportion of loss on out-turn of coin	·000016	·0000308	Gain.

F. Bowyer Miller,
Superintendent of the Bullion Office.

* Some metal belonging to the coinage of the previous year was recovered and brought to account.

† The figures in the Deputy Master's Report are a little higher: this is due to the fact that 2,118·81 ounces of scissel which remained on hand at the end of 1879 were exchanged for sovereigns and issued.

APPENDIX "B."

RETURN of the Quantity and Value of Gold received for Coinage at the Melbourne Branch of the Royal Mint; of the Gold Coin and Gold Bullion issued therefrom; and of the Revenue derived from Mint Charges, &c., from the opening of the Mint on 12th June 1872 to 31st December 1879.

Period.	Gold received for Coinage.		Issued.						Revenue.		
			In Coin.			In Bullion.		Total Value of Coin and Bullion.	From Mint Charges on Gold.	From Sale of Silver and other Sources.	Total Revenue.
	Gross Weight.	Value of Gold at 3*l.* 17*s.* 10½*d.* per oz. standard.	Sovereigns.	Half-sovereigns.	Total Value.	Quantity.	Value.				
	oz.	£ s. d.	No.	No.	£	oz.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1872*	190,738·14	764,917 6 9	748,000	—	748,000	1,205·468	3,610 9 7	751,610 9 7	2,655 19 11	1,289 6 6	3,945 6 5
1873	221,870·44	887,126 15 6	752,000	165,000	834,500	3,166·002	11,035 6 6	845,535 6 6	3,492 10 8	1,628 17 3	5,121 7 11
1874	335,317·62	1,349,101 17 3	1,373,000	—	1,373,000	2,911·722	10,416 10 0	1,383,416 10 0	4,861 14 9	1,692 17 10	6,554 12 7
1875	489,731·59	1,947,712 14 3	1,888,000	—	1,888,000	3,552·872	13,857 4 8	1,901,857 4 8	4,514 13 0	3,412 17 2	7,927 10 2
1876	543,198·59	2,149,480 17 6	2,124,000	—	2,124,000	3,624·578	14,144 10 1	2,138,144 10 1	3,960 12 4	4,192 12 5	8,153 4 9
1877	378,310·33	1,491,819 4 9	1,487,000	80,000	1,527,000	3,326·060	13,004 4 9	1,540,004 4 9	2,856 5 7	3,658 0 2	6,514 5 9
1878	569,932·17	2,267,430 10 0	2,171,000	—	2,171,000	3,691·003	14,640 4 10	2,185,640 4 10	3,929 3 3	4,643 2 1	8,572 5 4
1879	656,555·84	2,637,738 8 9	2,740,000	—	2,740,000	1,740·276	6,829 12 11	2,746,829 12 11	3,783 19 9	5,564 11 2	9,348 10 11
Total	3,385,654·72	13,495,327 14 9	13,283,000	245,000	13,405,500	23,157·981	87,538 3 4	13,493,038 3 4	30,054 19 3	26,082 4 7	56,137 3 10

* From 12th June, the day the Mint opened to the public.

Countries from which imported:—

Country.	During the Year 1879.	Since the opening of the Mint.
	oz.	oz.
Victoria	493,062·22	2,519,308·25
New South Wales	599·61	2,987·21
New Zealand	113,106·93	698,060·24
Queensland	124·81	1,598·40
South Australia	12,807·63	68,180·62
Tasmania	33,634·40	75,596·41
Unknown	3,220·24	18,560·67
Natal	Nil.	1,362·92
Totals	656,555·84	3,385,654·72

Royal Mint, Melbourne,
16th February 1880.

V. DELVES BROUGHTON,
Deputy Master.

APPENDIX "C."

RETURN showing the Amount and Destination of Gold Coin exported from Victoria, and the Amount issued from the Mint, in each Month of the Year 1879.

Month.	To where Exported.						Total Amount Exported.	Amount issued from Mint.	Excess of Sovereigns issued from Mint over Sovereigns Exported.	Excess of Sovereigns Exported over Sovereigns issued from Mint.
	Galle.	United Kingdom.	South Australia.	N. S. Wales.	New Zealand.	Tasmania.				
	£	£	£	£	£	£	£	£	£	£
January -	127,574	80,000	—	500	—	—	208,074	275,000	66,926	—
February -	216,290	—	—	—	—	—	216,290	195,000	—	21,290
March -	63,500	—	—	—	10,000	—	73,500	241,000	167,500	—
April - -	54,254	50,000	25,000	—	—	—	129,254	217,000	87,746	—
May - -	49,190	—	—	—	20,000	—	69,190	204,000	134,810	—
June - -	28,030	5,000	10,000	—	20,000	500	63,530	232,000	168,470	—
July - -	24,512	—	15,000	50,500	40,000	20,000	150,012	153,000	2,988	—
August -	42,845	—	—	—	20,000	5,000	67,845	205,000	137,155	—
September -	47,850	—	—	15,000	70,000	—	132,850	249,000	116,150	—
October -	117,943	—	—	—	65,000	—	182,943	300,000	117,057	—
November -	24,825	—	—	230	—	—	25,055	197,000	171,945	—
December -	3,340	20,000	—	—	—	10,000	33,340	272,000	238,660	—
Total -	800,153	155,000	50,000	66,230	245,000	35,500	1,351,883	2,740,000	—	—

Royal Mint, Melbourne,
16th February 1880.

V. DELVES BROUGHTON,
Deputy Master.

No. XII.

PAPERS showing the CHANGES made in the ADMINISTRATION of the FRENCH MINT.

LOI du 31 Juillet 1879 relative à l'exécution de la fabrication des monnaies par voie de régie administrative sous l'autorité du Ministre des Finances. (Promulguée au *Journal Officiel* du 2 Août 1879.)

Le Sénat et la Chambre des députés ont adopté,
Le Président de la République promulgue la loi dont la teneur suit :

ARTICLE PREMIER.

La fabrication des monnaies est exécutée par voie de régie administrative, sous l'autorité du ministre des finances. Cette régie sera organisée dans un délai de six mois, a partir de la promulgation de la présente loi.

ART. 2.

Un décret, rendu en forme de règlement d'administration publique, détermine les conditions d'admission au bureau du change des matières propres à la fabrication des monnaies, ainsi que le mode d'émission des bons de monnaie et de délivrance des espèces.

Il fixe les frais de fabrication conformément au principe posé par le paragraphe 1er de l'article 11 de la loi du 7 germinal an XI.

ART. 3.

Le bon de monnaie délivré contre le versement des matières d'or ou d'argent forme titre contre le trésor, à la charge toutefois, par la partie versante, de le faire viser immédiatement et séparer de son talon par le contrôle spécial de la régie.

Ce bon de monnaie est, comme les effets négociables du trésor, exempté du droit et de la formalité du timbre.

ART. 4.

Il est créé une commission de contrôle de la circulation monétaire, composée de neuf membres désignés : un par le Sénat, un par la Chambre des députés, un par le Conseil d'État, un par la Cour des comptes, un par le conseil de la Banque de France, deux par l'académie des sciences et deux par la chambre de commerce de Paris.

La commission élit son président ; elle le choisit parmi ses membres.

Les nominations son faites pour trois ans ; les membres sortants sont rééligibles. Leurs fonctions sont gratuites.

ART. 5.

La commission s'assure de la régularité de l'émission des pièces au point de vue du poids et du titre, et, à cet effet, elle fait vérifier, à la fin de chaque année, des échantillons prélevés sur chacune des brèves admises en délivrance dans le cours de cette année.

Cette vérification porte également sur des pièces extraites de la circulation.

Le nombre et le mode de prélèvement de ces échantillons, ainsi que les mesures nécessaires pour garantir leur identité, seront déterminés par le règlement d'adminstration publique.

ART. 6.

Dans le premier mois de chaque année, la commission remet au Président de la République un rapport sur les résultats de la fabrication effectuée pendant l'année précédente et sur la situation matérielle de la circulation.

Ce rapport est publié et distribué au Sénat et à la Chambre des députés.

ART. 7.

Le compte détaillé des opérations de la régie est joint chaque année au compte général de l'administration des finances.

ART. 8.

Les lois actuellement en vigueur sont abrogées en ce qu'elles ont de contraire aux dispositions qui précèdent.

La présente loi, délibérée et adoptée par le Sénat et par la Chambre des députés, sera exécutée comme loi de l'État.

Fait à Paris, le 31 Juillet 1879.

Le Ministre des Finances, (Signé) JULES GRÉVY.

(Signé) LÉON SAY.

DÉCRET du 31 Octobre 1879 portant règlement d'administration publique sur la fabrication des monnaies.

Le Président de la République française,

Sur le rapport du Ministre des finances;

Vu la loi du 31 Juillet 1879 réglant le mode de fabrication des monnaies;

Vu l'article 2 de cette loi, ainsi conçu :

"Un décret rendu en forme de règlement d'administration publique, détermine les conditions d'admission au bureau du change des matières propres à la fabrication des monnaies, ainsi que le mode d'émission des bons de monnaie et de délivrance des espèces.

"Il fixe les frais de fabrication, conformément au principe posé par le paragraphe 1er de l'article 11 de la loi du 7 germinal an XI";

Vu l'article 5 de la même loi portant que le nombre et le mode de prélèvement des échantillons destinés aux vérifications de la Commission de contrôle de la circulation monétaire, ainsi que les mesures nécessaires pour garantir leur identité, seront déterminés par le même règlement d'administration publique;

Vu les décrets des 22 Mai et 15 Septembre 1849, 22 Mars et 8 Avril 1854 et la décision ministérielle du 20 Juillet 1857 concernant le tarif et l'évaluation du titre des matières d'or et d'argent;

Le Conseil d'État entendu;

Décrète :

ARTICLE PREMIER.

Les frais de fabrication à exiger des porteurs de matières sont fixés, par kilogramme au titre monétaire (0,900), à six francs soixante-dix centimes (6 fr. 70 cent.) pour les matières d'or et un franc cinquante centimes (1 fr. 50 cent.) pour les matières d'argent.

ART. 2.

Le tarif des matières d'or et d'argent établi conformément à l'article ci-dessus est publié et affiché au bureau du change.

Les titres sont exprimés sur ce tarif en millièmes et dixièmes de millième.

Il n'est pas tenu compte, dans les pesées, des quantités inférieures à un décigramme pour l'or et à un gramme pour l'argent.

Les sommes à payer aux porteurs de matières sont calculées d'après les titres et les poids ainsi déterminés.

ART. 3.

Sont seuls admis de droit par le bureau du change :

1° Les lingots propres au monnayage, affinés au titre minimum de neuf cent quatre-vingt-quatorze millièmes (0,994) et du poids de six à sept kilogrammes pour l'or et de trente à trente-cinq kilogrammes pour l'argent.

2° Les monnaies étrangères inscrites au tarif;

3° Les ouvrages d'or et d'argent marqués des poinçons de titre français.

Les lingots d'un titre inférieur au titre ci-dessus, mais supérieur au titre monétaire, pourront être admis s'il a été reconnu par l'essai qu'ils sont propres au monnoyage.

ART. 4.

En cas de désaccord sur le titre entre les porteurs de matières et le laboratoire d'entrée, la contestation est portée devant l'Administration des monnaies qui fait procéder à un contre-essai par le laboratoire de sortie. Cette opération sert à déterminer définitivement le titre, mais le porteur a la faculté, s'il n'en accepte pas le résultat, de retirer ses matières.

ART. 5.

Après détermination du titre, il est délivré, contre le versement des matières au bureau du change, un ou plusieurs bons de monnaie au porteur ou nominatifs et transmissibles par voie d'endossement. Ces bons sont souscrits par le caissier agent comptable de la monnaie et visés par le contrôleur au change. Mention sera faite sur les bons de l'obligation du visa.

L'échéance des bons de monnaie est fixée par arrêté du Ministre des finances, sans qu'elle puisse dépasser un mois.

ART. 6.

Au moemnt de la coulée des matières d'argent et après la coulée des matières d'or, le chef des travaux et le contrôleur de la fonderie prélèvent une goutte pour l'essai des fontes d'argent et une peuille sur la première et la dernière lame pour l'essai des fontes d'or.

ART. 7.

Le directeur des essais fait déterminer le titre de la goutte et des peuilles par le laboratoire de sortie. Le résultat est constaté par un procès-verbal signé par les essayeurs. Une expédition de ce procès-verbal, certifié par le directeur des essais, est remise sans délai à l'Administration, qui autorise le laminage des lames ou en prescrit la refonte, s'il y a lieu.

ART. 8.

Lorsque le monnayage d'une brève est terminé, le chef des travaux et le contrôleur principal prélèvent chacun au hasard : sur les brèves de monnaies d'or, deux pièces; sur les brèves de monnaies d'argent de 5 francs, de 2 francs, 1 franc et 50 centimes, quatre pièces; et sur celles

de 20 centimes, huit pièces ; sur les brèves de monnaies de bronze, cinq pièces.

Ces pièces sont adressées sous le cachet des deux fonctionnaires, une au moins de chaque catégorie, à l'Administration, et les autres pièces au directeur des essais.

ART. 9.

Les pièces adressées à l'Administration sont enfermées dans une caisse à deux clefs destinée au dépôt des échantillons devant servir aux vérifications annuelles de la Commission de contrôle institutée par la loi du 31 Juillet 1879.

L'une des clefs est remise au directeur des essais, l'autre est confiée par le directeur général à l'employé supérieur qu'il aura désigné.

ART. 10.

Le directeur des essais fait essayer, par le laboratoire de sortie, les échantillons de pièces destinées à l'analyse.

Les résultats de ces essais sont constatés par un procès-verbal signé par le vérificateur et les essayeurs. Une expédition de ce procès-verbal, certifiée par le directeur des essais, est adressée sans délai à l'Administration.

ART. 11.

Le contrôleur principal fait vérifier le poids et l'empreinte de chacune des pièces composant la brève dont il a envoyé les échantillons.

Il rebute les pièces qui sont en dehors du poids légal de tolérance ou dont les empreintes sont défectueuses.

La vérification terminée, il dresse procès-verbal de ces résultats et remet une expédition de ce procès-verbal au sous-directeur qui la transmet, revêtue de son visa, à l'Administration.

ART. 12.

Sur le vu des procès-verbaux du directeur des essais et du contrôleur principal, le directeur général autorise la delivrance de la brève ou en prescrit la refonte, s'il y a lieu.

ART. 13.

Les membres de la Commission de contrôle de la circulation monétaire se réunissent chaque année, conformément à l'article 5 de la loi du 31 Juillet 1879, sur la convocation du Ministre des finances, à l'Hôtel des Monnaies de Paris.

La Commission se constitue en nommant son président et son secrétaire.

ART. 14.

Cette Commission reçoit de l'Administration des Monnaies les clefs de la caisse à deux serrures contenant les pièces prélevées sur chaque fabrication ou brève et mises en réserve.

Après s'être assurée que le nombre de ces pièces est conforme aux indications portées sur le relevé fourni par l'Administration des Monnaies, elle en prélève la quantité qu'elle juge nécessaire et en fait constater le poids et le titre en sa présence par les personnes qu'elle a choisies.

Des pièces prélevées dans la circulation par les ordres de la Commission sont soumises aux mêmes épreuves.

ART. 15.

Le Ministre des finances est chargé de l'exécution du présent décret.

Fait à Paris, le 31 Octobre 1879.

Par le Président de la République (Signé) JULES GRÉVY.
Le Ministre des Finances,
(Signé) LÉON SAY.

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